...RY DEPARTMENT

May 19, 1947

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 47

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DETROIT

The WEAN ENGINEERING Company, Inc.
WARREN, OHIO

SPECIALISTS IN SHEET, TIN & STRIP MILL EQUIPMENT

WEAN EQUIPMENT Corporation
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NARROW STRIP AND WIRE MILL MACHINERY

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Sheave to Transmit 1400 Horsepower...

...or a Belt for a 1/4 hp Compressor!

CALL ON THE TEXROPE LINE for the *best* in V-belt engineering and V-belt equipment. That has been true for 22 years — ever since Allis-Chalmers originated the Multiple V-belt drive for industry.

Back of every *Texrope* installation — from fractional horse power V-belts that manufacturers put on washers, air-compressors or water systems—to the biggest V-belt drives ever designed and successfully applied—stands the finest V-belt engineering talent in the world.

There's no substitute for this vast experience and tremendous fund of knowledge. It is reflected in every *Texrope* product.

What do *you* need . . . a few V-belts and sheaves — or a daring new application of the multiple V-belt principle? Call on the *Texrope* line! Equipment and engineering help are as close as your nearest A-C sales office or dealer. ALLIS-CHALMERS, MILWAUKEE.

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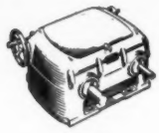
TEXROPE .. Greatest Name in V-Belt Drives

"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.



SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

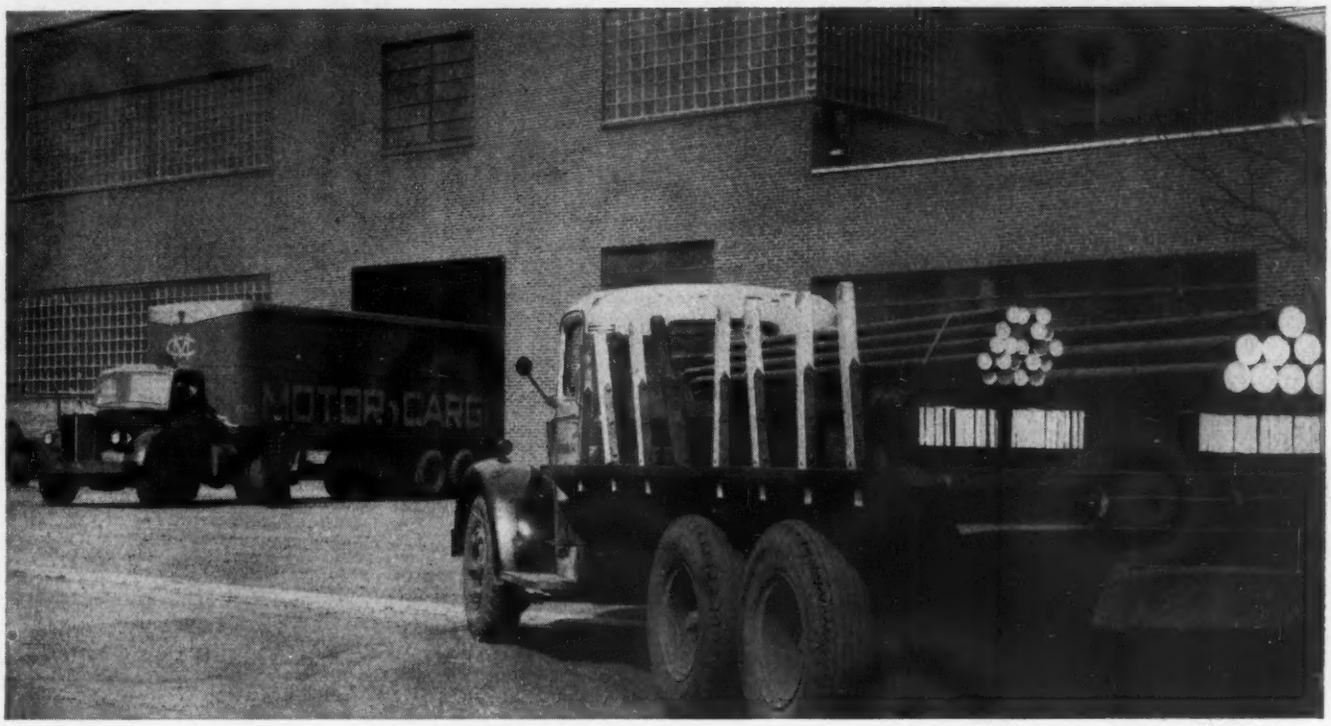
ALLIS·CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE
to Industry
THAT MADE
America Great

Bethlehem's New Tool Steel Depot

Speeds Delivery to Mill Customers



This new, completely-modern depot is located adjacent to the tool steel mill at Bethlehem, Pa. Complete facilities are available for stocking and handling selected tonnages of standard tool steels.

Prompt delivery is an important factor in the tool steel business. That's why Bethlehem's new mill depot is an important service to mill customers and to distributors of Bethlehem Tool Steels and their customers. Standard tool and die steels, stocked in popular sizes and shapes, are now being shipped to all parts of the country by rail and truck from this streamlined depot. All grades stocked are identified by heat number, chemical analysis, and hardenability tests.

Featured in the new mill depot are the popular grades of tool steel which fit most applications:

Tool and Die Steels

Carbon and
Carbon-Vanadium (water-hardening)
BTR (oil-hardening)
Lehigh H (air-hardening)

General-Purpose Shock Tool Steels

Omega (oil- or water-hardening)
67 Chisel (oil- or water-hardening)

High-Speed Steels

BSHS (18-4-1 composition)
66 HS (6-5-4-2 composition)

Bethlehem metallurgists and tool-steel specialists are always ready to talk applications with you. Plan now to let Bethlehem work with you on your next tool steel problem.

BETHLEHEM
Complete
TOOL STEEL SERVICE

- Quality tool steels for every job
- Metallurgical Assistance
- Prompt delivery
- Distributors and offices everywhere

BETHLEHEM STEEL COMPANY
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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

★ BETHLEHEM STEEL ★

BETHLEHEM TOOL STEELS for EVERY JOB

AIR POWERED

SCREW DRIVER IS THE ANSWER

The picture above shows an Ingersoll-Rand Size OOOBLC air-powered screw driver applying four No. 8 screws that hold the leads to the brick on an automatic waffle iron. This insulating brick is very brittle and torque on the screw must be accurately controlled.

The I-R Screw Driver features a cushion clutch that minimizes rotary impacts and allows delicate torque adjustment. An integral part of the cushion clutch is an engaging clutch which permits the motor to run but rotates the bit only when the operator exerts a slight forward pressure on the screw driver.

Air tools are definitely superior for screw driving. I-R Screw Drivers offer you many advantages ... small size ... light weight ... more power per pound ... accurate torque adjustment ... dependability ... run cool to the touch.

Air-powered screw drivers may be the answer to some of your problems. A reversible model is available in every instance where a reversible tool can be used to greater advantage. Call our nearest branch office for further details or a demonstration.

Ingersoll-Rand

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COMPRESSORS • AIR TOOLS
ROCK DRILLS • TURBO BLOWERS
CONDENSERS • CENTRIFUGAL PUMPS
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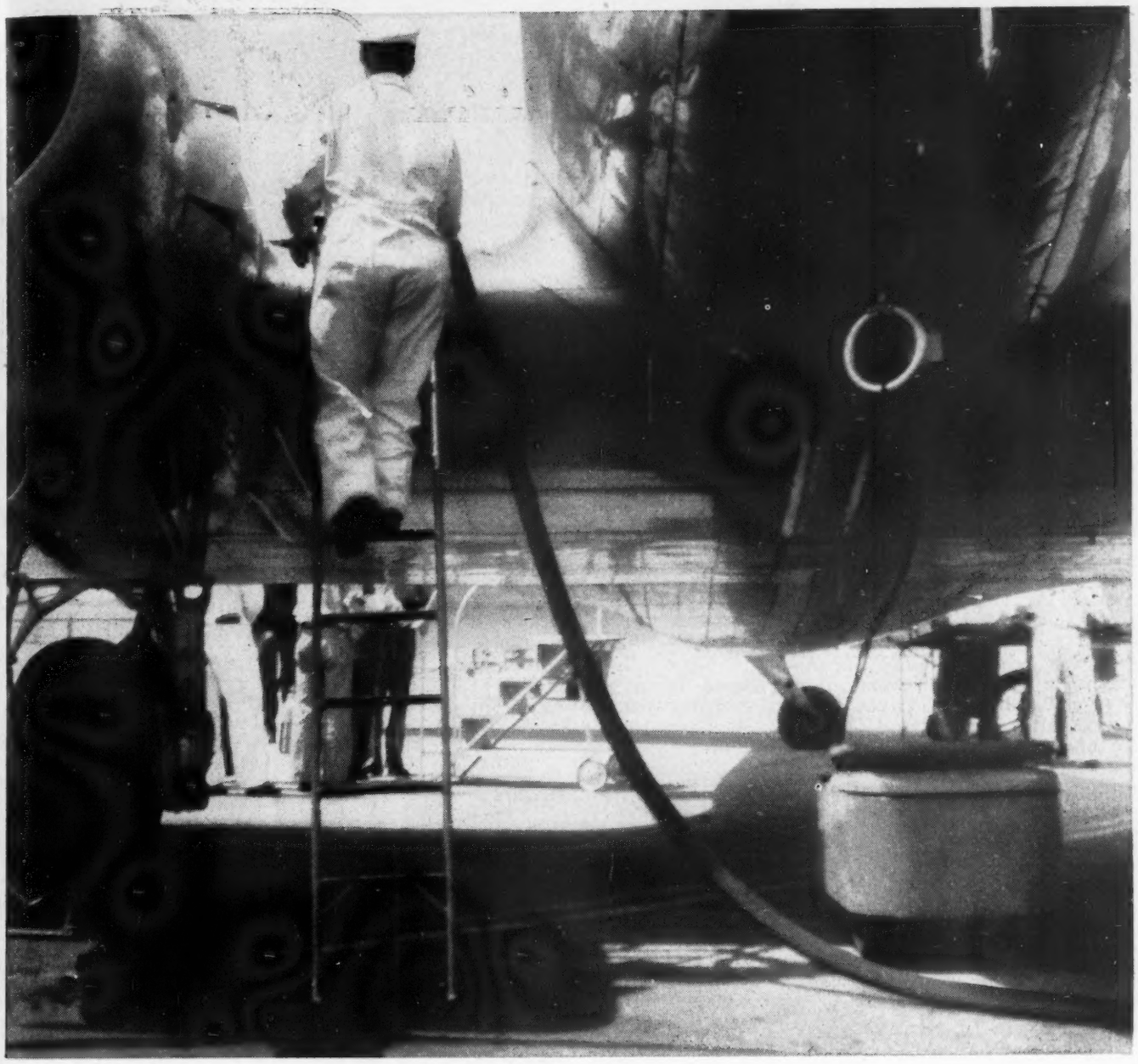

50-foot collapsible straw for a 5000-gallon drink

A typical example of B. F. Goodrich development in rubber

EVERY minute of extra time on the ground by a 300-mile-an-hour airplane represents 5 air miles lost. Greatest waste of time used to be in refueling.

Hose big enough to fill a plane's 5000-gallon tanks in a hurry was too heavy — hauling 50-foot lengths of it up and over the plane took valuable time. So a smaller hose had to be used, which meant slow flow, with time lost in filling tanks.

B.F.Goodrich engineers, who had developed so many improvements in aviation, went to work on this problem. With their experience in designing hundreds of different types and sizes of hose for almost every purpose, they developed another one which was large enough yet light in weight. The real development was that this new hose is so flexible it can be collapsed and hauled up on the plane empty, gas pumped through, the hose drained by suction, and so lightened, collapsed and hauled off again easily and quickly.

With this new hose a larger size could be used — a plane could be filled in one-fourth the former time and so put into the air 20 minutes sooner — be 100 miles on its way in the time saved by the hose alone.

This is the sort of development B.F.Goodrich is constantly making, to improve its products and their value to all users. *The B.F.Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F.Goodrich

FIRST IN RUBBER

Behind the Scenes...

Parts for Starved Rats

Some of the things which come through the mail are puzzling indeed, but one of the most incomprehensible wound up on our desk this week. It was from the Wing S. Laboratory, Grass Lake, Michigan. At first glance we thought maybe that was the guy's name, but the puzzle deepened when we noted on the side where most firms list their products or district sales offices or some such similar pertinent information that this outfit said, "Investigation on Rats with Cancer" and below that "Good Tools as Finance". We were completely befuddled after looking those mnemonics over carefully, but there was more to come. The letter had to do with the announcement of a new product, or products, the name being the Wing Nipple-Guide and Pipe-Chuck. Well, we are at sea. We can guess what those gadgets are, and in fact with the description before us, they seem to be perfectly rational gadgets. What that has to do with rats and cancer we don't know, nor was the mystery cleared up much when we noted way down at the bottom of the sheet that the full name of the outfit is the "Wing Starvation Laboratory". What things go on up in Grass Lake, Mich.!

What's With Boston?

Sometimes we are baffled by the mail we receive. Like the letter from the Federal Reserve Bank of Boston, which starts out by asking, "Have you had a chance to read our letter of April 14?" Now we didn't receive any letter of April 14, but we are mighty curious, because the current letter goes on for three paragraphs without the slightest reference to what was in that April 14 letter. Just tells us how important it was, and how we really ought to answer it and contribute to the storehouse of information they're gathering on the New England economy. Any of you who are on speaking terms with the right people in Boston might drop a hint that we'd like to know what it's all about —and let that be a lesson to us never to refer to anything without telling what we're referring to.

Who Knows the Answer?

The impossibility of drawing sane conclusions from good evidence was brought home to us forcibly the other day by the commentaries of two economists of repute. Both taking as their premise the dropping prices on such diverse things as women's clothes, whiskey and canned goods, one forecast a recession while the other saw a return to sanity and the end of inflation. Maybe they were both talking about the same thing, we wouldn't know. However, we are inclined to agree with the boss' editorial a few issues back pointing out that a taste of depression is a little too strong medicine to have to take right now.

They Loved Him There

Incidentally, and speaking of the boss, Mr. Shaner has just returned from the West Coast where he made one of the key speeches to the American Warehouse Association in their annual convention. We think he does a pretty good job on his weekly editorial, too, and judging from the number of requests we have for extra copies, a lot of you agree. If any of them strike your fancy, drop us a line. We'll be glad to hear from you, and extra copies are always available, just for the asking.

Puzzle Corner Answers

So far none of the answers to that puzzle about the dinner party have turned out to be the same as the one we cribbed out of the back of the book. We have answers ranging from 4 to 40, but in the book it said the answer is 80. Honest. We didn't dream it up, we copied it out of a book! Probably before this issue sees the light of day, we'll have scads of correct answers, but up to now we've got you all licked, heh, heh.

Which One's Black?

Signs of the times—as seen in the classified ads: Scotch whisky, all you want, only $6 per fifth; bonded bourbon, all you want, $5 per fifth; automobiles, all you can find we'll buy at $1000 over the market for Cadillacs, less for others. And here in Cleveland they've located a black market operator in automobiles who makes everybody suspicious because he sells the cars at list prices and requires no trade-in, with virtually immediate delivery. Question: is he in the black market or is the legitimate dealer from whom you can't begin to get so good a deal the real black market?

Shrdlu

(Editorial Index—page 47)

STEEL

Vol. 120—No. 20 May 19, 1947

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Editorial Staff on Contents Page

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Eye Appeal-Sales Appeal

TO THE CONSUMER eye appeal means *buy appeal.* The arresting appearance of Sharon Stainless Steel tips the sales in your favor. Quality-conscious consumers demand clean design . . . lasting beauty . . . permanent freedom from corrosion, stain and tarnish.

TO THE PRODUCT DESIGNER Sharon Stainless Steel means a superior product made under precise metallurgical control. It is ideal for deep drawing, spinning, roll forming, bending, welding, heat treating and machining.

TO THE FABRICATOR Sharon Stainless Steel means reduced fabricating and handling costs. Ease of fabrication of Sharon Stainless—furnished in coils up to 300 pounds per inch of width, or in cut lengths, if desired,—permits longer, smoother machine runs. Shipments are packaged on skids for quick, economical handling.

TO YOU we offer the services of qualified Sharon sales engineers to aid in selecting the proper steels to solve your specific fabrication problems. Call or write the nearest Sharon field office *today.*

SHARON STEEL CORPORATION

Sharon, Pennsylvania

SHARONSTEEL

PRODUCTS OF SHARON STEEL CORPORATION AND SUBSIDIARIES: THE NILES ROLLING MILL COMPANY, NILES, OHIO; DETROIT SEAMLESS STEEL TUBES COMPANY, DETROIT, MICHIGAN; BOPP STEEL CORPORATION, DETROIT, MICHIGAN; BRAINARD STEEL DIVISION, WARREN, OHIO. Hot and Cold Rolled Stainless Strip Steel — Alloy Strip Steel — High Carbon Strip Steel — Galvanite Special Coated Products — Cooperage Hoop — Detroit Seamless Steel Tubing — Seamless Steel Tubing in Alloy and Carbon Grades for Mechanical, Pressure and Aircraft Applications — Electrical Steel Sheets — Hot Rolled Annealed and Deoxidized Sheets — Galvanized Sheets — Enameling Grade Steel — Welded Tubing — Galvanized and Fabricated Strip Steel.

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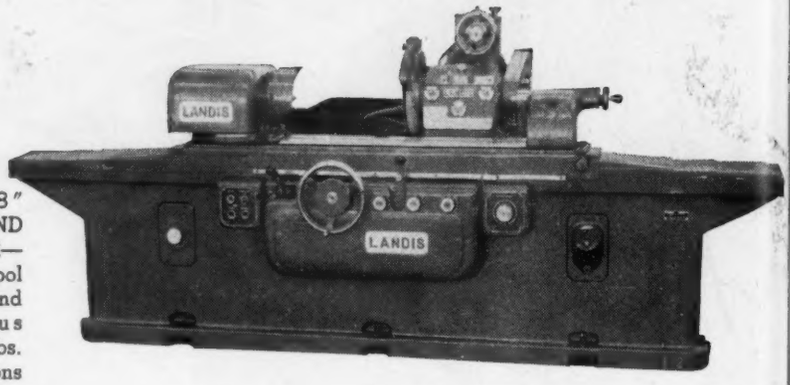
Reduce Precision Grinding Costs BY FITTING

UNIVERSAL GRINDERS

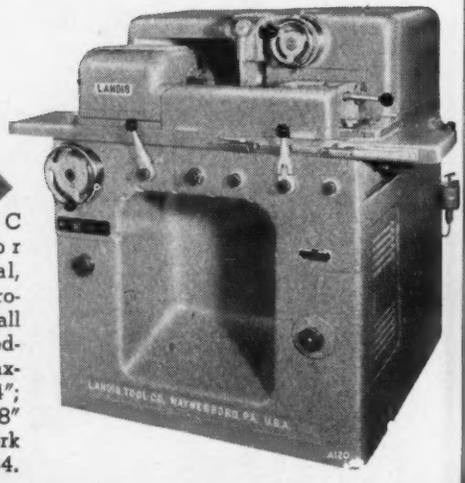
12" x 28" UNIVERSAL AND TOOL GRINDER—For precision tool room grinding and miscellaneous small grinding jobs. Grindingoperations on standard machines: cylindrical, taper, face, surface, clearance on saws, flutes on taps, face of teeth on formed cutters, spiral mills. Usefulness extended by 22 optional accessories. Catalog K45.



12" LCH HYDRAULIC UNIVERSAL GRINDER—For tool room and production grinding—straight cylindrical, shoulder, taper, face and internal. Maximum work diameter 12"; available in four sizes for work lengths of 30", 36", 40" and 48". Catalog I44.

PLAIN GRINDERS

10"—14" TYPE CH PLAIN HYDRAULIC GRINDER—For straight cylindrical, shoulder, taper and profile grinding of volume production of parts such as: motor armatures, shafts, spindles, crankshaft line bearings, steering knuckles, etc. Maximum work diameters 10" and 14". Available for each in lengths between centers of 18", 36", 48", 72", 96", 120". Catalog B43.



4" TYPE H PLAIN HYDRAULIC GRINDER—For straight cylindrical, shoulder, taper or profile grinding of small light parts not exceeding 1½" diameter. Maximum diameter 4"; available in 12" and 18" lengths between work centers. Catalog A44.

SPECIAL MACHINES FOR SPECIAL JOBS

- Crankshaft Grinding
- Crankshaft Regrinding
- Camshaft Grinding
- Valve Grinding
- Ball Race Grinding
- Roll Grinding

OPTIONAL ADDITIONAL FEATURES and TOOLING FOR HIGH PRODUCTION

- Automatic Sizing
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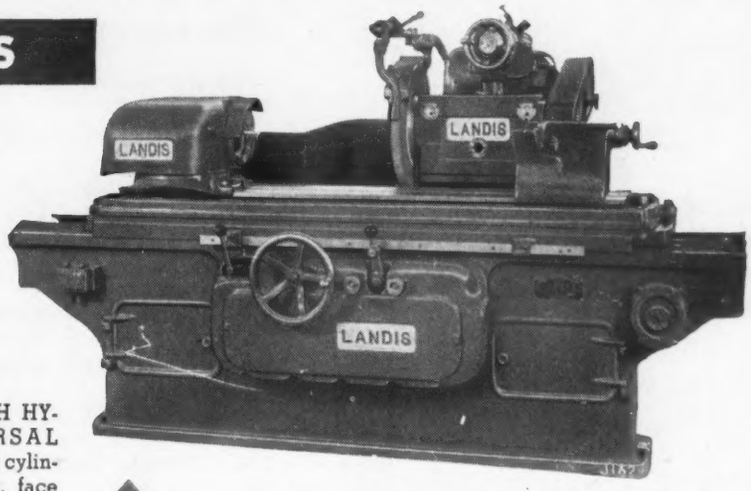
- Wheel Dressing Fixtures
- Work Ejectors
- Work Holding Fixtures

LANDIS TOOL COMPANY • WAYNESBORO, PA.

THE MACHINE TO THE JOB

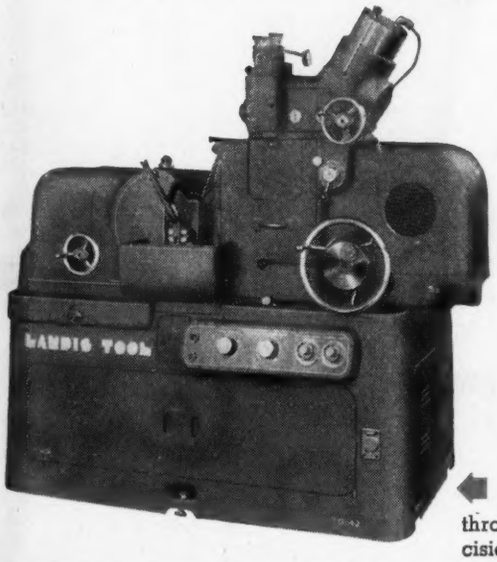
UNIVERSAL GRINDERS

10" x 20" TYPE H HYDRAULIC UNIVERSAL GRINDER—For straight cylindrical, shoulder, taper, face and internal grinding. Ideal for fast production of small tools and precision small parts which require universal features such as face or internal grinding. Catalog I-145.



12" — 14" — 16" — 18" TYPE C HYDRAULIC UNIVERSAL GRINDERS—For straight cylindrical, shoulder, taper, face and internal. For tool room grinding of quantities of gauges, mandrels and boring bars; for production grinding and very fine finishes. Available in three maximum work lengths—36", 48" and 72" for maximum work diameters of 12", 14", 16" and 18". Catalog I242.

CENTERLESS GRINDERS



CENTERLESS THREAD GRINDER—For through feed grinding of threads to high precision in a single pass with a formed wheel.

NO. 12 CENTERLESS GRINDING MACHINE—For through feed straight cylindrical grinding, taper grinding and infeed grinding up to a shoulder. Work diameters 1/16" to 3 1/2". Catalog T44.

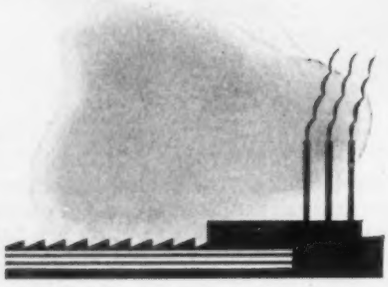
OVER 150 DIFFERENT TYPES OF LANDIS TOOL PRECISION GRINDERS

all available with the exclusive *microsphere wheel spindle bearing* for fine finish and close tolerances and LANDIS TOOL engineered grinding service to help you get the best solution.

EQUIPPED WITH MICROSPHERE BEARINGS

LANDIS TOOL *Precision Grinders*

ARE YOU KEEPING UP WITH JONES?



The return of competition must figure largely in the plans of management today. To be abreast of what is new is the minimum price of profit in the period just ahead. New methods... new machines... new ways of handling men which lead to more production—these are the keys to profit when enterprise is free.

Wise management draws freely on competent outside help. Our permanent staff offers a broad background of experience in engineering and management practice—plus much specific "know-how" in the metal working industries. We would like to discuss your problems in the light of our experience. A note or phone call will bring one of our principals to your office for a conference, without obligation to you.

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INCENTIVE COMPENSATION • COSTS • METHODS • ARCHITECTURE

ESTABLISHED 1937

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BACKGROUND FOR SUCCESS
The quality of materials used in making steel and iron is the basis of their ability to meet today's stringent requirements.
The excellent quality of VANCORAM ferro-alloys, consistent from lot to lot, aids manufacturers in the production of steels and irons for maximum performance both in processing and in use.
Our metallurgists will be glad to cooperate with you on specific applications.
Makers of FERRO-ALLOYS
VANCORAM BRAND
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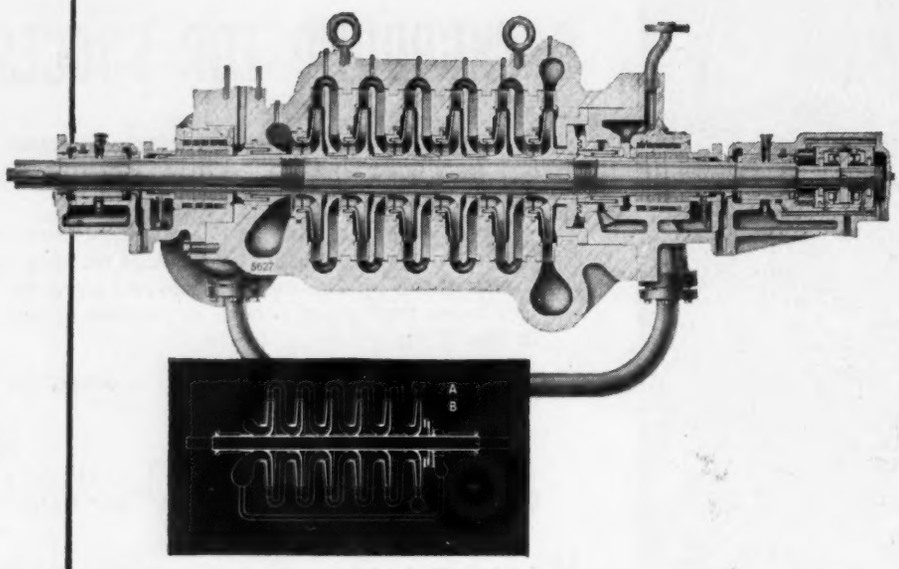
ALL THRUST ALWAYS BALANCED



The exceptionally satisfactory performance of De Laval high pressure boiler feed pumps over many years is due, in no small measure, to the De Laval Automatic Hydraulic balancing arrangement. With this hydraulic balance, all thrust is automatically brought to a state of perfect equilibrium, the functioning of the device being unaffected by wear, load or other variables.

How the thrust is balanced

Any unbalanced thrust causes the rotor to shift axially, thus regulating flow through clearance A, thereby controlling pressure against balancing disc B and thus automatically returning the pump to a state of perfect balance.

Send for Catalog B-5-A describing De Laval multistage, single suction pumps for high pressure service.

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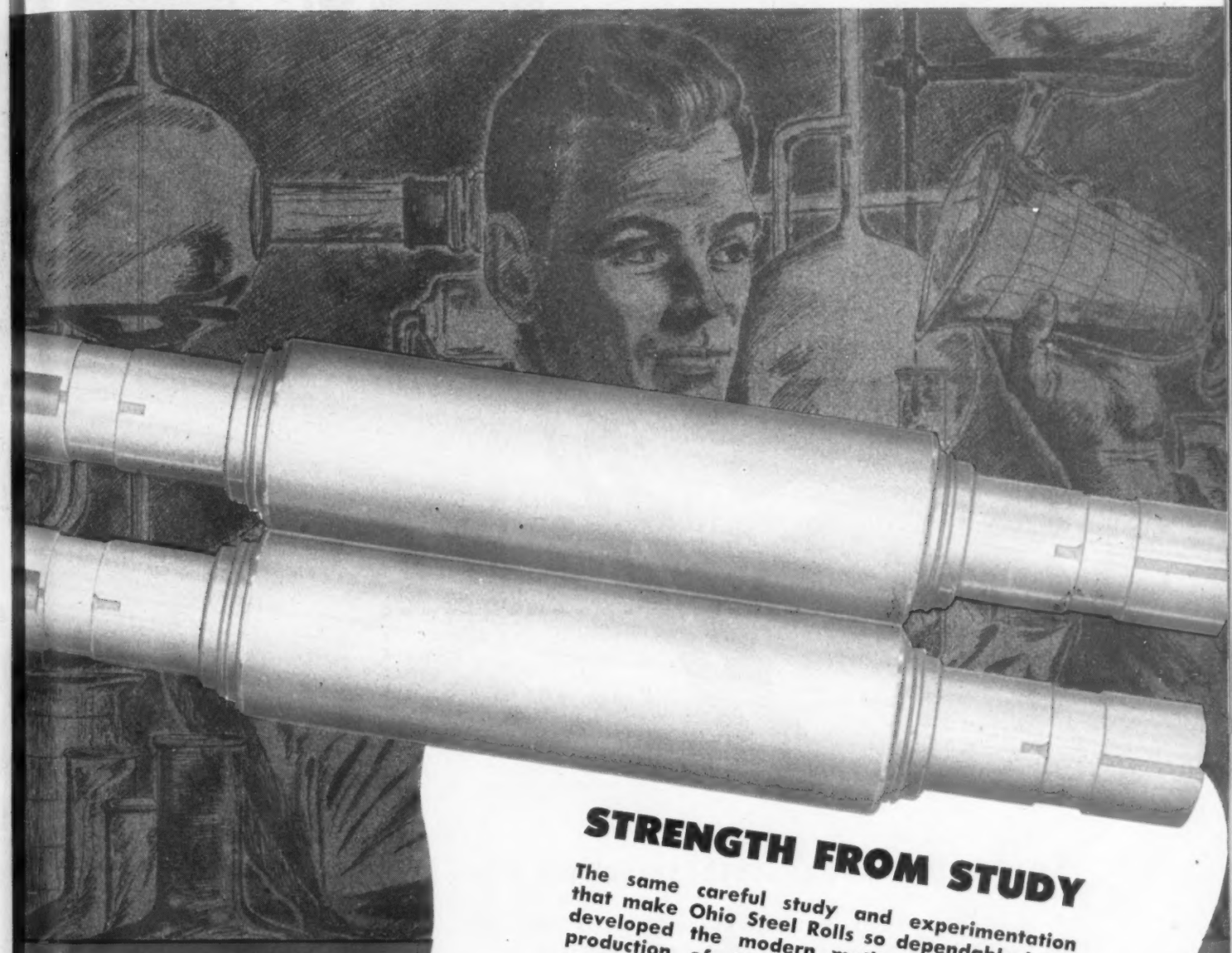
Strength from Study



STRENGTH FROM STUDY

The same careful study and experimentation that make Ohio Steel Rolls so dependable have developed the modern methods now used in production of Ohio Iron Rolls. The strength, superior wearing and finishing quality of Ohio Iron Rolls are features born of continuous research and testing.

Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY

THE OHIO STEEL FOUNDRY COMPANY

LIMA, OHIO

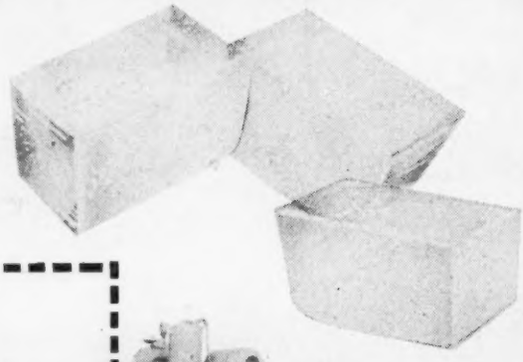
Plants at Springfield and Lima, Ohio

Select from any of these eleven types of Ohio Steel and Iron Rolls: Carbon Steel Rolls, Ohioloy Rolls, Ohioloy "K" Rolls, HOLL-O-CAST Rolls, Chilled Iron Rolls, Alloy Chilled Iron Rolls, Dense Iron Rolls Nickel Grain Rolls, Special Iron Rolls, Nioloy Rolls, Flintuff Rolls.

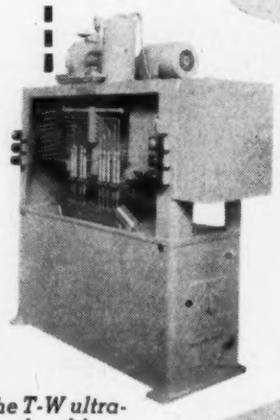
HOT PRODUCTION ON A -COLD ITEM-

★12 assemblies Every minute

(16 PIECES PER ASSEMBLY)



(Upper left) the welded, aluminum, flexible ice cube separator and the backbone strip before welding. Notice the 18 projections.



(Right) the T-W ultra-hydrospeed welder.

★ON A T-W HYDRO-ULTRASPEED WELDER

A jig holds the 16 aluminum parts (backbone, 7 fins and 8 inter-locking sections), and indexes into the T-W ultra-hydrospeed welder (illustrated). The 18 projections are automatically welded.

Four operators, working in pairs, produce 12 uniform assemblies per minute, every minute, hour after hour, with essentially no rejects.

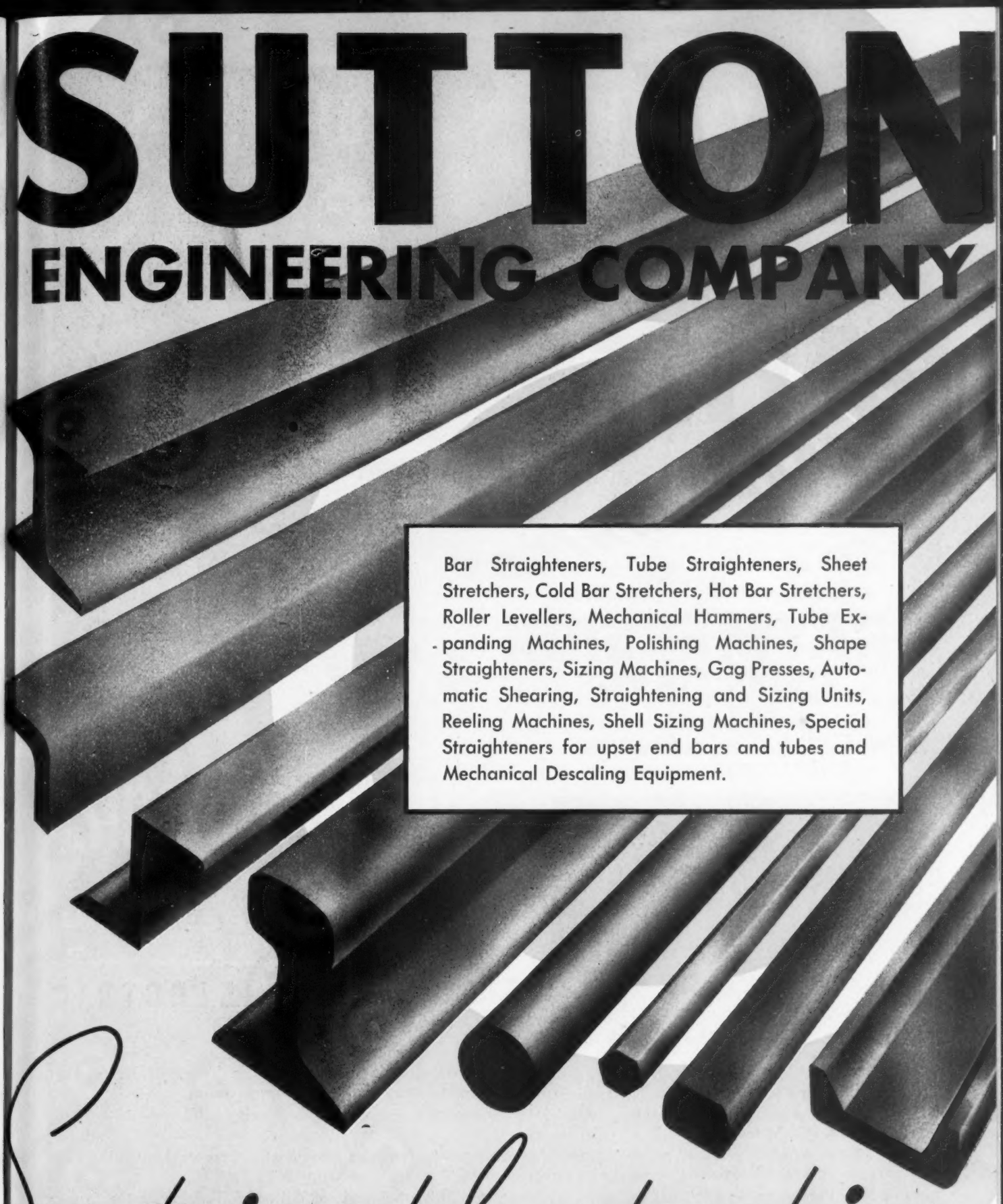
Servel made use of T-W's Engineering Service and both collaborated to produce this superior design of welder for Servel's refrigerator tray ice cube separator.

Resistance welding, properly applied, can bring you new production returns, too. T-W representatives can assist you in adapting spot, projection, seam, or flash-butt welding to your products.

THE TAYLOR-WINFIELD CORPORATION
WARREN • OHIO

TAYLOR-WINFIELD
RESISTANCE WELDERS

SUTTON
ENGINEERING COMPANY



Bar Straighteners, Tube Straighteners, Sheet Stretchers, Cold Bar Stretchers, Hot Bar Stretchers, Roller Levellers, Mechanical Hammers, Tube Expanding Machines, Polishing Machines, Shape Straighteners, Sizing Machines, Gag Presses, Automatic Shearing, Straightening and Sizing Units, Reeling Machines, Shell Sizing Machines, Special Straighteners for upset end bars and tubes and Mechanical Descaling Equipment.

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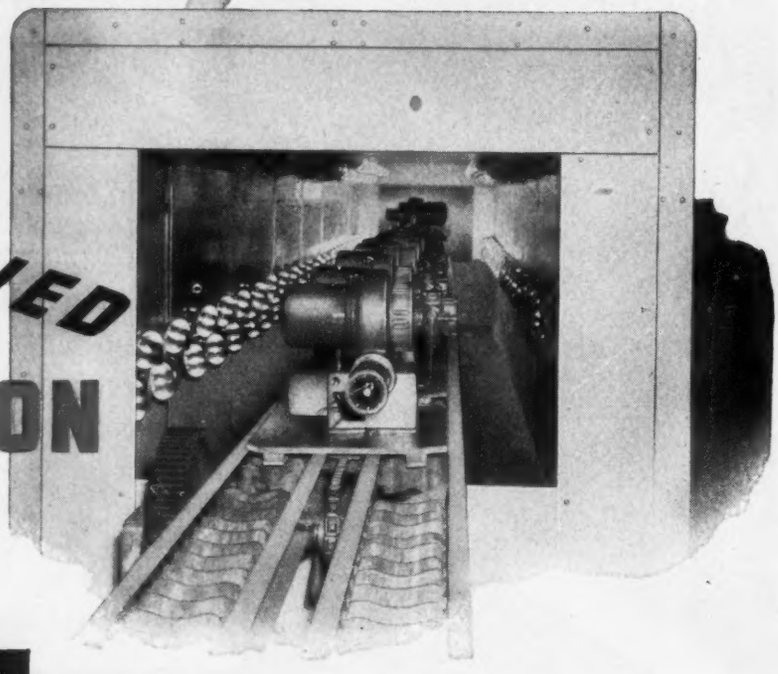
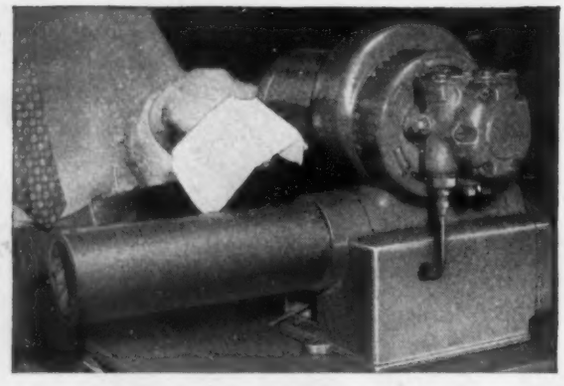
RAYMERSION

INFRA-RED OVEN



WON'T EVEN SPOT A HANDKERCHIEF!



TRUMBULL (T) ELECTRIC

The facts on this installation of a Trumbull Raymersion Infra-Red Oven should be important to many manufacturers for the following reasons:

1. The oven, 45 ft. in length, was assembled from unit sections which permit building to any width, height or length.
2. A completely assembled oil burner is sprayed with a force-dry gray paint . . . passes through the oven at 2 ft. per minute . . . maximum temperature 170° F. . . . operating load 90 KW.
3. Production is 320 units per day . . . saving the plant thousands of dollars annually over the former process.
4. The finish is so dry and so clean that it may be wiped with a white handkerchief without spotting.

If your present baking or drying process is not satisfactory, ask the nearest Trumbull representative for recommendations. Raymersion Ovens will save time and space, improve finish, reduce costs. Bulletin on request.

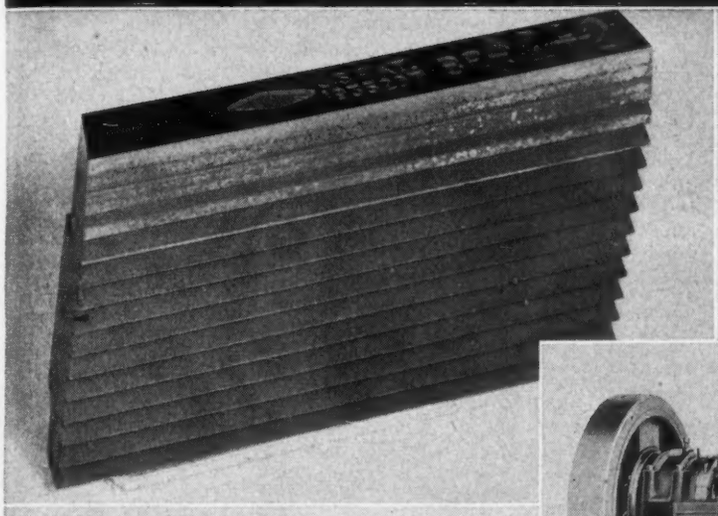
THE TRUMBULL ELECTRIC MANUFACTURING COMPANY

PLAINVILLE, CONNECTICUT

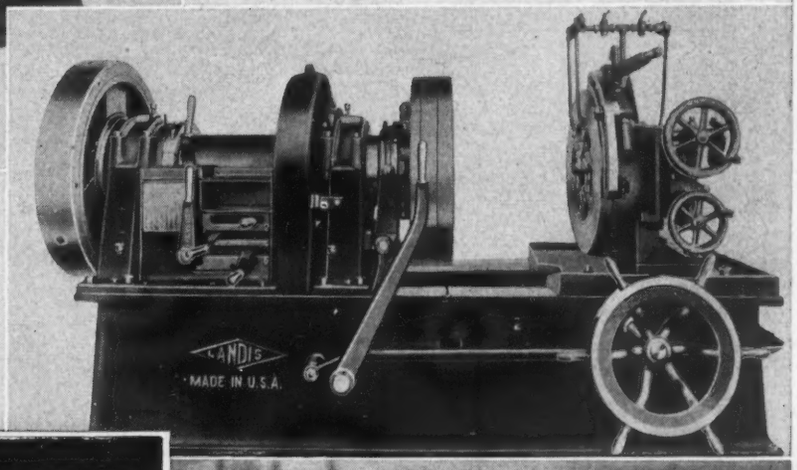
OTHER FACTORIES AT NORWOOD, OHIO, LOS ANGELES, SAN FRANCISCO, SEATTLE

For FLEXIBILITY & HEAVY DUTY

Landis Pipe Threading and Cutting Off Machines built in nine different sizes, thread pipe from 2" to 20" in diameter inclusive.



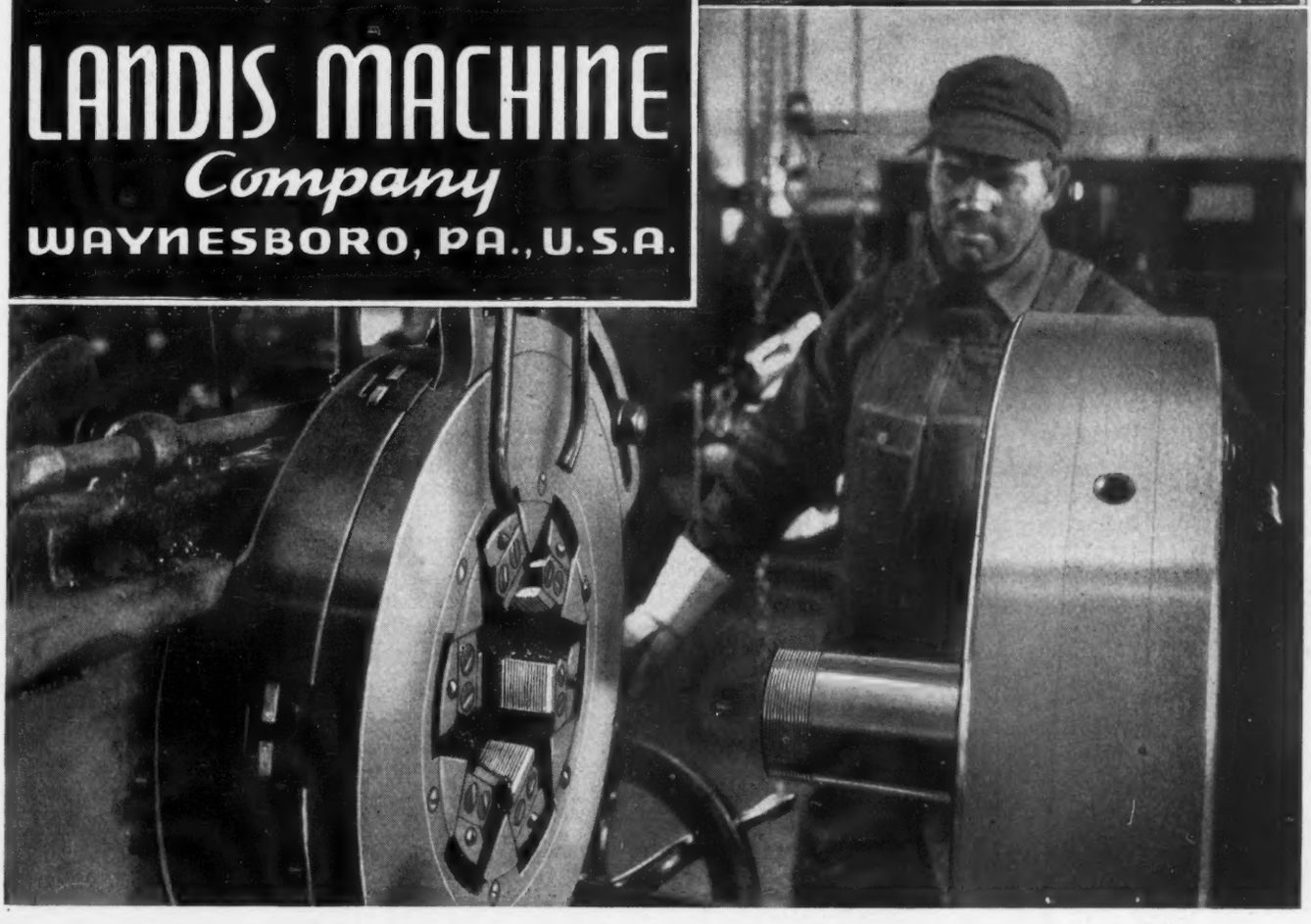
The Landis Stationary Die Heads applied to our Pipe Threading and Cutting Off Machines minimize spoilage—insure high degree concentricity due to floating action of die head in T-slot of cross rail.



Landis Tangential Pipe Chasers employed in Stationary Head—one set chasers required to cover range of die head—eliminates the changing of chasers for each diameter of threads produced—assuring accurately formed threads and low threading cost.

LANDIS MACHINE *Company*

WAYNESBORO, PA., U.S.A.



FOR HEAVY STOCK REMOVAL

To settle all doubt—

MICROHONING CUTS CHIPS! MICROHONING IS METAL CUTTING!

These Are Microhoned Honing Chips—

Millions—Billions—of such small scale chips are cut by the many thousands of face contacting grits in an average 3 to 6 stone set of honing stones—all cutting at the same time. Combined—they can remove a lot of metal—up to .080" on diameter—in a relatively short time—or at rate of .006" to .008" per minute.

This means that high production now has a new method of short-cutting time cost by honing from the green bore—hardening—and finish honing—with elimination of intermediate bore machining operations.

It is economical in other ways. New additive treatments in Micromatic Honing Stones yield from 200% to 400% more bores per set of stones than was formerly possible.

MICROMATIC HONE CORPORATION • DETROIT 4, MICHIGAN

DISTRICT FIELD OFFICES: 1323 S. Santa Fe, Los Angeles 21, Cal. • 194 Dalhousie St., Brantford, Ont., Can. • 616 Empire Bldg., 206 S. Main St., Rockford, Ill. 501 Harries Bldg., 137 No. Main St., Dayton 2, Ohio • 927 A—M & M Bldg., P.O. Box 981, Houston 2, Texas • Room 514—129 Church St., New Haven 10, Conn.

In your quest for production efficiency, you can count on Weirton strip to serve you as a willing partner, ever ready to ease manufacturing difficulties and to effect economies. Because of its uniformity in composition and thickness, and its exceptional drawing and forming qualities, Weirton strip can be depended on to speed production and to reduce spoilage and scrap losses.

WEIRTON STEEL CO.

WEIRTON, W. VA. *Sales Offices in Principal Cities*

Division of **NATIONAL STEEL CORPORATION** *Executive Offices, Pittsburgh, Pa.*

SAFER—SURER—SWITCHING

The complete absence of smoke and steam in switching and hauling operations conducted with Whitcomb Diesel locomotives, is an important safety factor. Ground signals transmitted to the operator are easily and surely received, resulting in safer train movements and less fatigue for the crew.

Accidents due to poor visibility are materially reduced; easier, smoother switching and hauling result because the operator's vision is never clouded by dense smoke or steam. He can see where his locomotive is going and what's on the track ahead of him.

The economies that are possible in reduced maintenance and operating costs should be reason enough to replace all your steam locomotives with Whitcomb Diesels. The safety factors including the lowering of the accident rate are important additional reasons why Whitcomb Diesel locomotives should be doing all your switching and intra-plant hauling.

DIESEL ELECTRIC LOCOMOTIVES FROM 25 TO 95 TONS
DIESEL MECHANICAL LOCOMOTIVES FROM 3 TO 30 TONS

BLW
THE BALDWIN GROUP

THE WHITCOMB LOCOMOTIVE CO.

ROCHELLE, ILL.

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

N•B•M BRONZE PARTS
BETTER BRONZE PARTS

N-B-M engineers are not satisfied with castings that are just "good enough". They try to make improvements wherever possible: study the end-use of the product — figure out a better alloy, simpler coring method, stronger wall design or some other new technique that will improve performance for you.

All this extra engineering costs you nothing — saves you money in the long run through more efficient production and greater value.

N•B•M
BRONZE PARTS

We put more service into them — you get more service out of them

NBM

AMERICAN
Brake Shoe
COMPANY

NATIONAL BEARING DIVISION
ST. LOUIS • NEW YORK

PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N. J. • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

In the Old Battle for New Ways
TO REDUCE PRODUCTION COSTS

...improved materials handling, because in the past so often neglected, probably holds greater possibilities than any other element of cost in modern production.

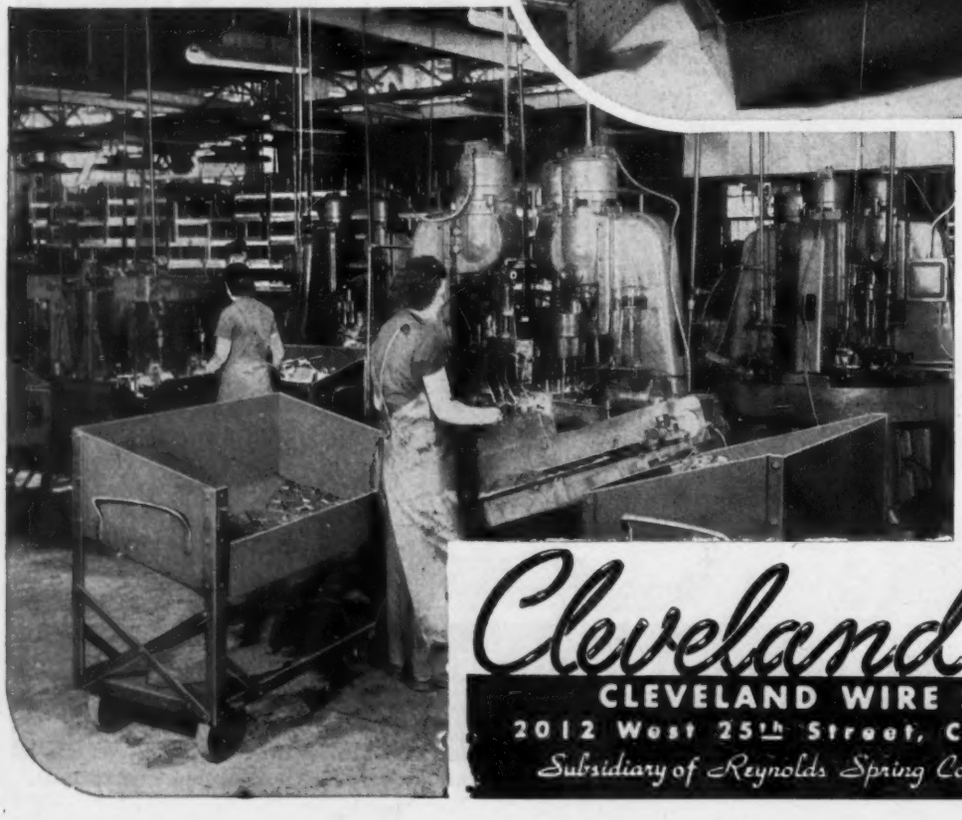
Production has aptly been called "materials in motion"—*in* machines and processing equipment, as well as *between* them and departments for finishing, packaging, storage and shipment.

This often calls for "Cleveland" shop containers and other steel equipment designed and built to fit individual needs, because the mass production of small products permits of no compromise with efficiency or fitness for their intended functions. "Cleveland" make stock as well as special sizes and models, specializing in designing and building to order to suit individual requirements.

STEEL FACTORY EQUIPMENT DIVISION
CLEVELAND WIRE SPRING COMPANY

ORIGINAL IDEAS!

Replacing boxes of more conventional type the Soss Mfg. Co., Detroit, uses a smaller number of relatively large capacity box trucks for most efficient handling of small products, (hinges) as here illustrated. Much time is saved by elimination of repeated pickups with separate truck and restacking. Where, as in this plant, successive operations are numerous, calling for frequent moves between machines or departments in close proximity, this idea has many advantages.



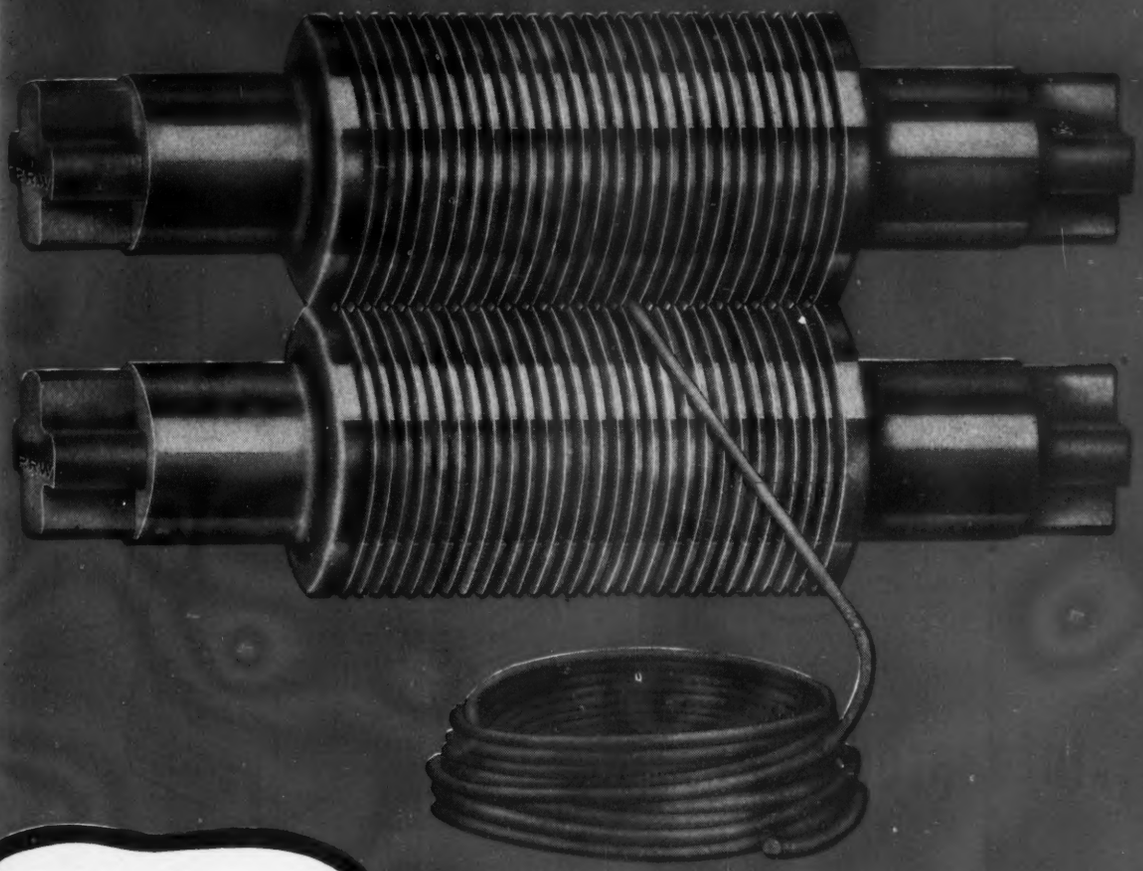
ASK FOR CATALOG

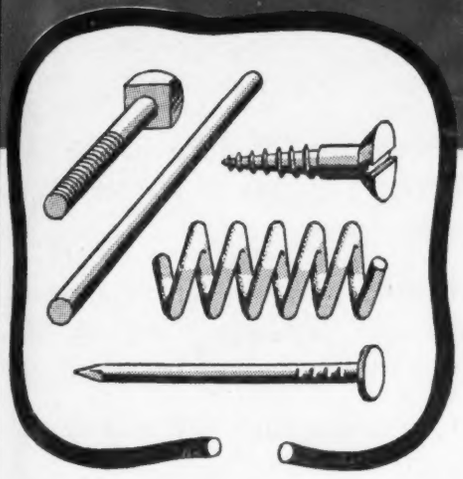
of "Cleveland" steel shop boxes, barrels, stools, hand trucks, tool boxes and cabinets, racks, bins, etc. Contains many valuable suggestions.

Cleveland **STEEL SHOP EQUIPMENT**

CLEVELAND WIRE SPRING CO.
2012 West 25th Street, Cleveland 13, Ohio
Subsidiary of Reynolds Spring Company, Jackson, Mich.

ROLLING TECHNIQUE . . .





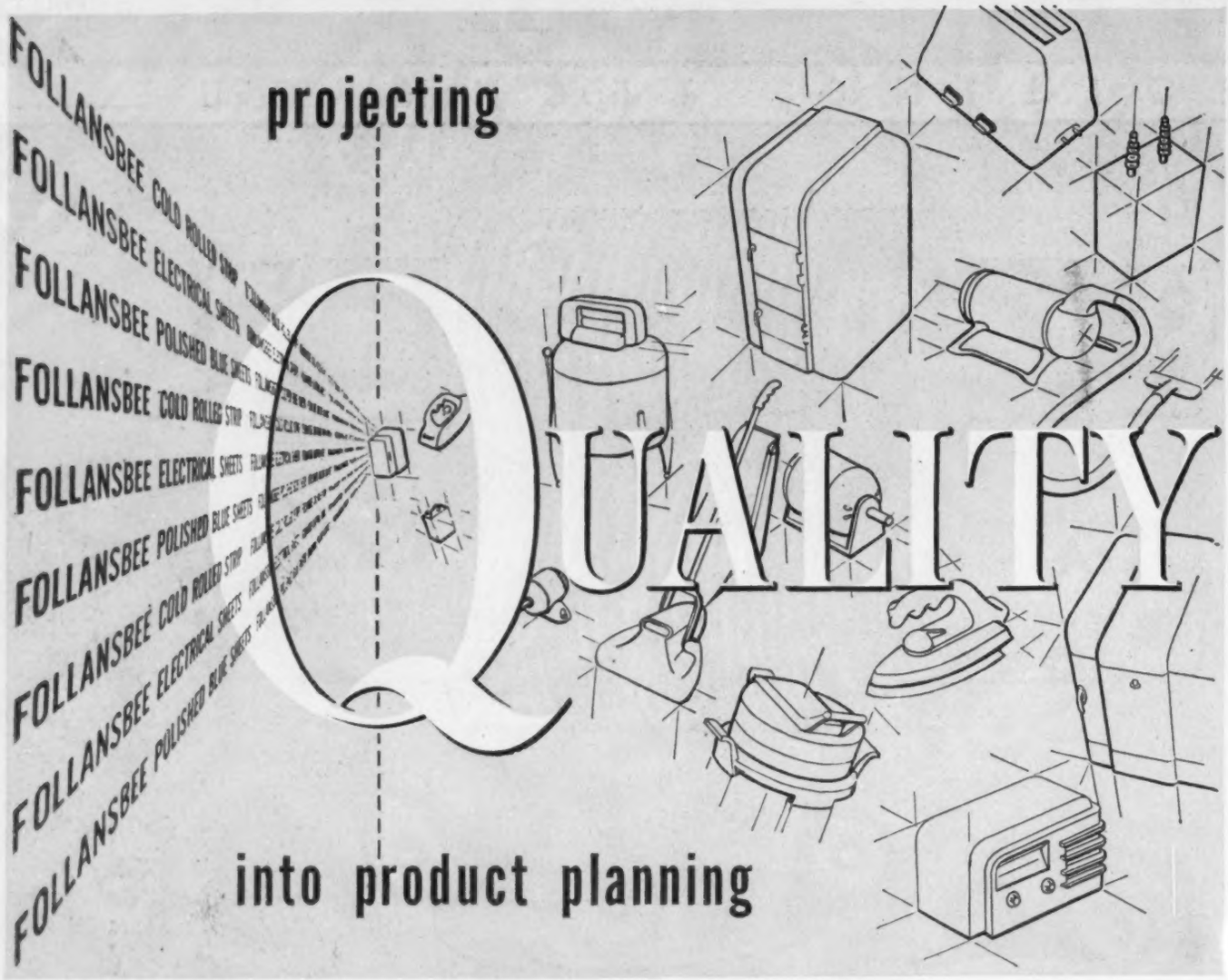
Rods

Rod mills, with their ever increasing delivery speeds, require better and better rolls to stand up and give high tonnages of quality rod. Continuous rod mills now in operation are rolling not only steel and numerous alloys but non-ferrous metals as well.

Pittsburgh Rolls, with over three-quarters of a century of roll-making experience and satisfactory performance behind them, can be relied upon to deliver the production of highest quality for which high speed modern mills are designed, at *less cost per ton of steel rolled.*

PITTSBURGH ROLLS
Division of Blaw-Knox Company
PITTSBURGH, PA.

PITTSBURGH ROLLS



Quality components will be the buyer's surest guide to quality products in the new era of competition. Manufacturers who can stress the quality of essential components will have first claim on purchasers' dollars.

Industrial designers and engineers who specify Follansbee specialty steels are projecting Follansbee time-proved quality into their new products; they are helping to establish their products in a market where the buyer will be king.

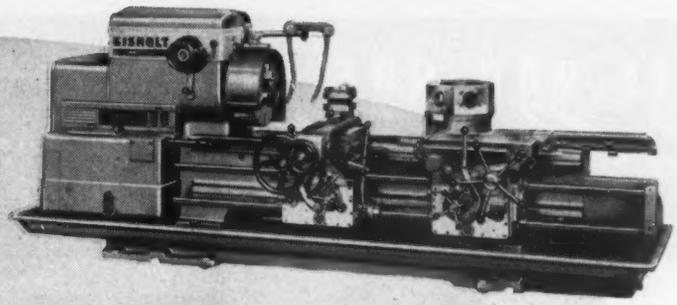
It is true that Follansbee Steel products are still in short supply. But it is just as true that the specifications for Follansbee specialty steels are rigidly maintained. Therefore, you can plan to use Follansbee steel in products now in the design stage. Just tell us what types and quantities you will need and when you will need them so that we can advise you as to availability.

FOLLANSBEE STEEL CORPORATION

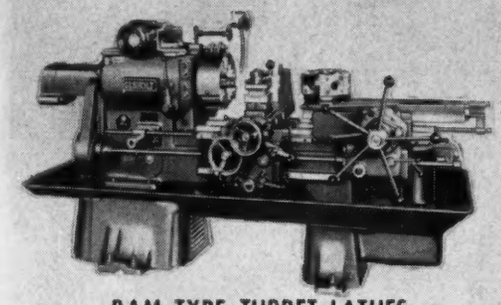
GENERAL OFFICES PITTSBURGH 30, PA.

Sales Offices: New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee.

Sales Agents: Chicago, Indianapolis, St. Louis, Kansas City, Nashville, Houston, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. *Plants:* Follansbee, W. Va., and Toronto, Ohio. *Follansbee Metal Warehouses:* Pittsburgh, Pa., Rochester, N.Y., and Fairfield, Conn. COLD ROLLED STRIP • ELECTRICAL SHEETS POLISHED BLUE SHEETS • SEAMLESS TERNE ROLL ROOFING



SADDLE TYPE TURRET LATHES



RAM TYPE TURRET LATHES

There's ONE Best Way for every job!

Are you seeking better ways of doing old jobs? Or does a new product create new problems in saving machining time and cost?

If you have these or other questions in the field of metal turning and surface-finishing, get authoritative answers from men who know. Bring your questions to the Gisholt "Round Table."

At Gisholt, the "Round Table" does not exist in fact—but in effect. For here, to assist you in the newest methods, is a concentration of skill and experience in producing round and semi-round parts—more extensive, we believe, than will be found anywhere else.

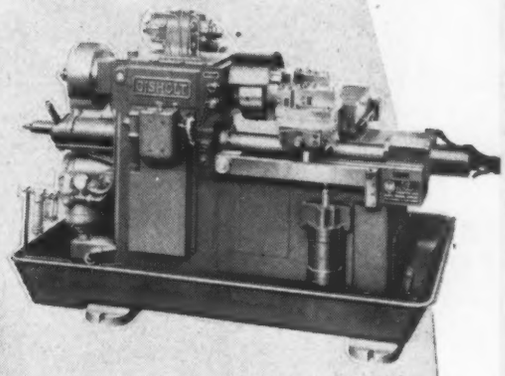
With its broad line of machining, surface-finishing and balancing equipment, Gisholt specialists can bring more knowledge to bear on your specific problems. And you may depend on their unbiased judgment.

GISHOLT MACHINE COMPANY

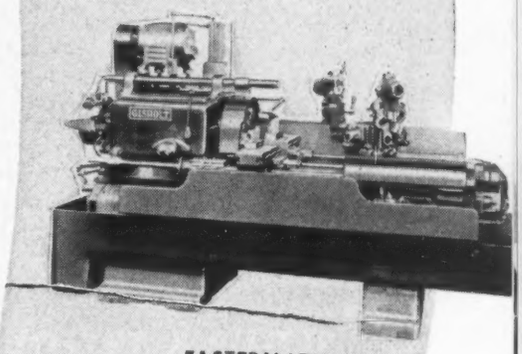
Madison 3, Wisconsin

THE GISHOLT ROUND TABLE

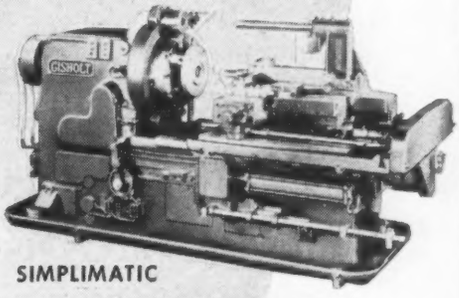
represents the collective experience of leading specialists in the machining, surface-finishing and balancing of round and semi-round parts. Your problems are welcomed here.



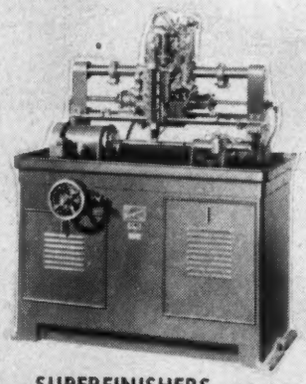
HYDRAULIC AUTOMATIC LATHES



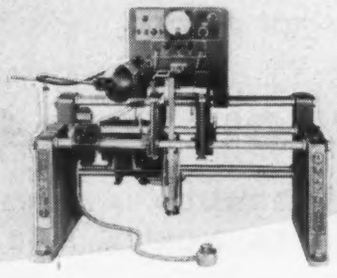
FASTERMATIC



SIMPLIMATIC



SUPERFINISHERS



BALANCERS

IF YOU ARE INTERESTED IN *Efficient* BROACHING PRODUCTION

Here is the complete broach service that guarantees you'll get it!

PLANNING

Detroit Broach aids in selecting your machines or adapting them . . . supplies complete cost and production data.

ENGINEERING

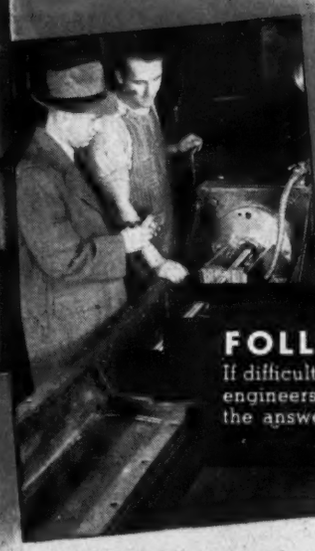
Tooling is designed by men who specialize in broach tooling only . . . men who know broaching technique.

MANUFACTURING

Tooling is produced on equipment selected specifically for the manufacture of broach tooling . . . in a plant producing nothing else.

SET-UP & TRY-OUT

Your machine set up and tried out at Detroit Branch . . . delivered to you *ready to go.*



FOLLOW-THRU

If difficulties later occur, field engineers are on the spot with the answer.

and it's handy, too.

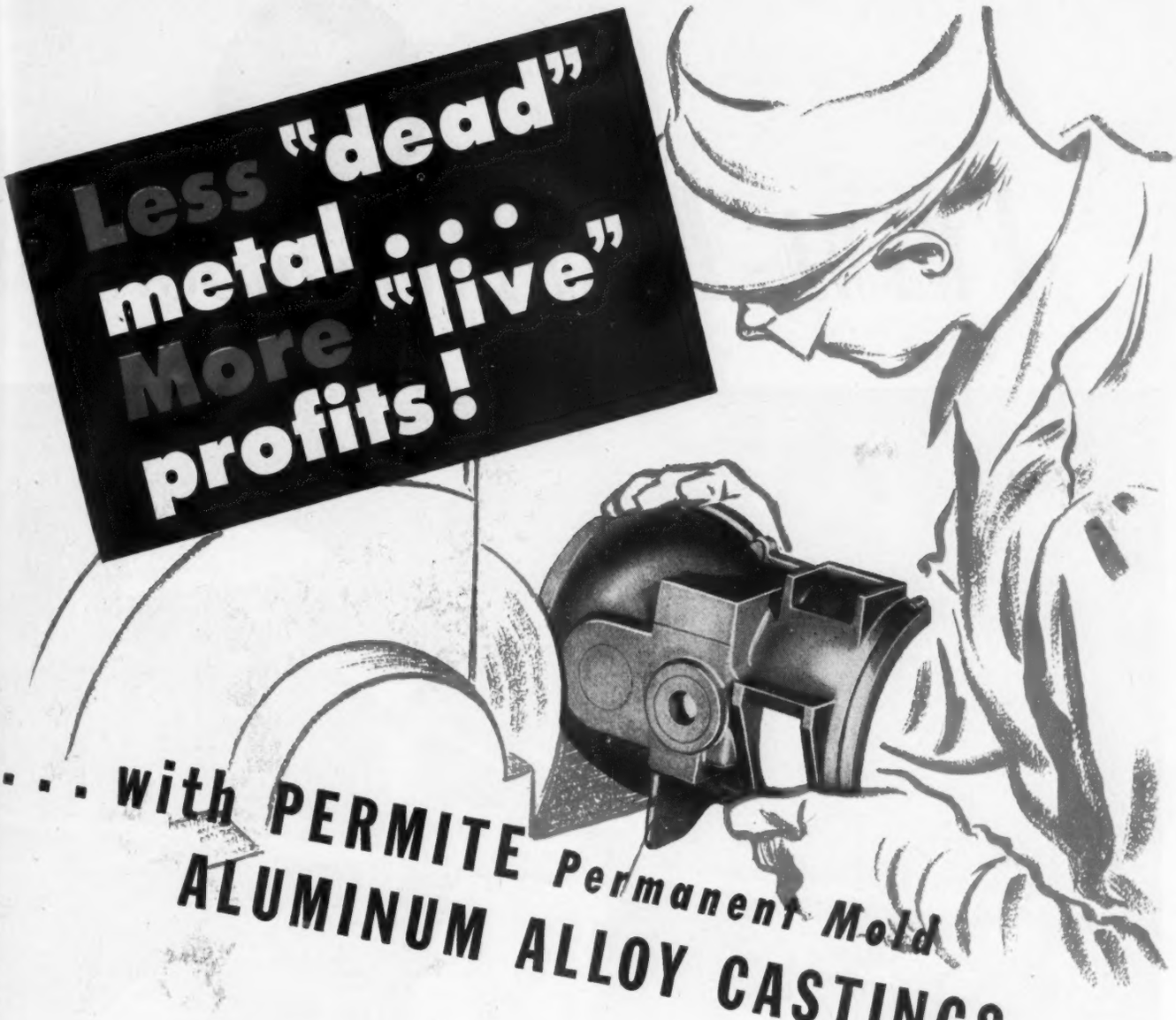
Wherever you are, there is a Detroit Broach representative in your locality to give you prompt service.

MEMBER BROACHING TOOL INSTITUTE

DETROIT *Broach* COMPANY

20201 SHERWOOD AVENUE • DETROIT 12, MICHIGAN
9308 SANTA MONICA BLVD. • BEVERLY HILLS, CALIF.

Less "dead" metal . . . More "live" profits!



. . . with PERMITE Permanent Mold ALUMINUM ALLOY CASTINGS

There's less "dead" metal to remove when aluminum alloy castings are made by the Permite permanent mold process. Precision tolerances as close as ±.010" provide consistent uniformity in duplication of design and freedom from dimensional variations.

As a result, machining operations are speeded up. You save time, labor and money . . . get faster, lower-cost production, higher profits.

Other profitable savings are possible, too, thru the greater tensile strength of Permite Permanent Mold Castings, which often permits thinner cross-sections and a resulting reduction in the weight and cost of your castings.

Permite Engineers and Foundrymen place at your service their twenty-seven years of experience in working with aluminum alloys. Let them show you how Permite Permanent Mold Castings can save you money. Submit your blueprints and specifications, without obligation.

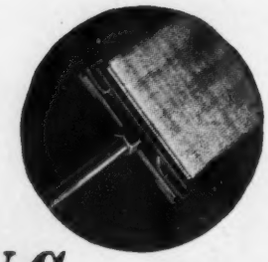
PERMITE

ALUMINUM INDUSTRIES, INC.

CINCINNATI 25, OHIO

DETROIT: 809 New Center Building. NEW YORK: 9 Rockefeller Plaza. CHICAGO: 64 E. Jackson Boulevard. ATLANTA: 413 Grant Building

ALUMINUM PERMANENT MOLD, SAND and DIE CASTINGS...HARDENED, GROUND and FORGED STEEL PARTS



FLAME-PRIMING smooths

Flame-priming is a fast, easy, inexpensive way to prepare any metal surface for a smooth, lasting paint coat.

LINDE OXYGEN • UNION CARBIDE
PREST-O-LITE ACETYLENE • OXWELD,
PUROX, PREST-O-WELD, HELIARC,
UNIONMELT EQUIPMENT FOR WELDING,
CUTTING, AND HEATING

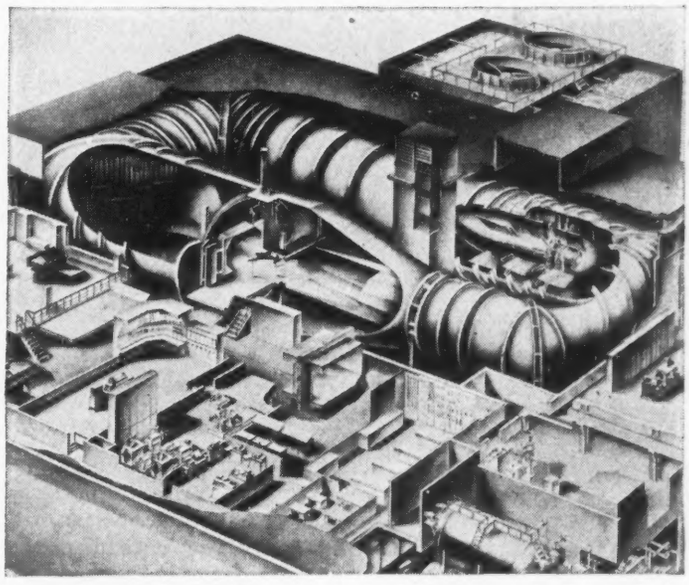
the way for the "Big Blow"

A typhoon is just a puff compared with the wind that whips through this test tube for model airplanes at Cornell Aeronautical Laboratory, Buffalo, N. Y. The "big blow" is created by two 22-foot diameter fans that can generate a wind of over 700 miles per hour.

The inside walls must be smooth, scale free, since this gargantuan blast would shear off any little specks and drive them through a valuable test model plane with devastating force. To prevent this, every little bit of scale was removed from the thousands of square feet of metal surface before painting by Linde's flame-priming process.

Flame-priming is simple to do, requires little equipment, and costs little. A brush of oxy-acetylene flames pops off scale and drives out moisture. Paint applied to the warm, dehydrated surface spreads easily, goes on smoothly, bonds tightly, and lasts longer.

Linde service engineers are always available to help with problems of treating, cutting, joining, and forming metals. Linde research is constantly at work on the development of new and better methods for the production and fabrication of metals.



Two huge 22-foot diameter fans, fabricated by UNIONMELT *welding, generate the wind for high-speed tests simulating high-altitude conditions.*

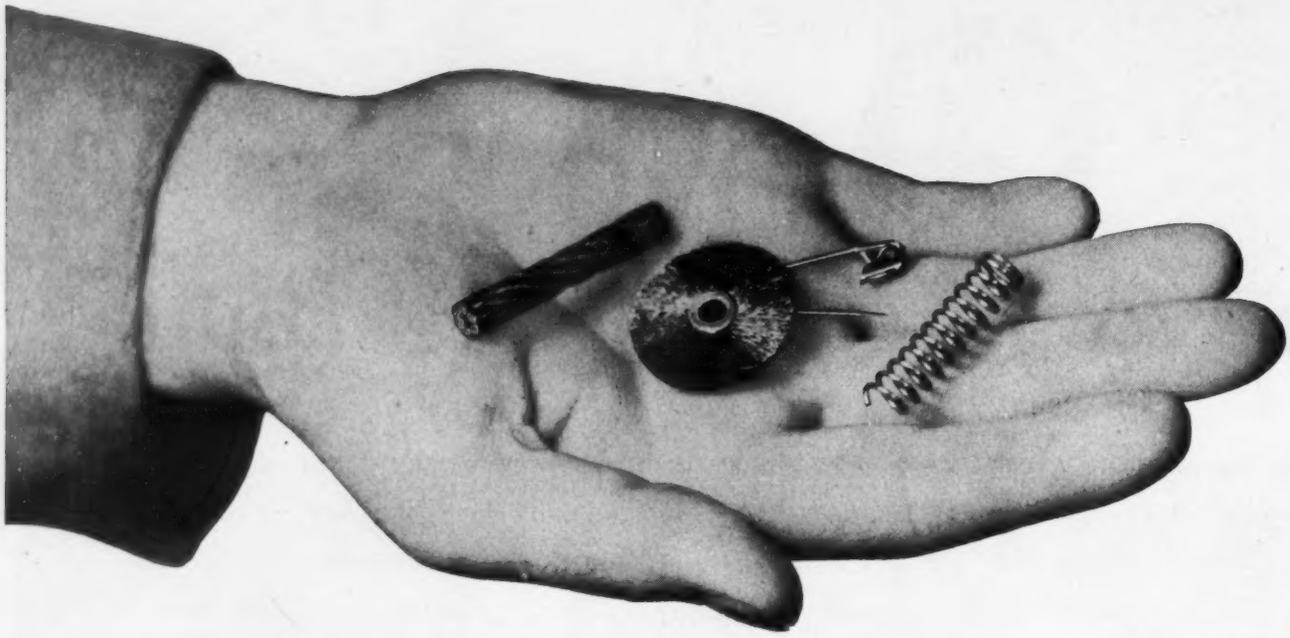
The words "Heliarc," "Linde," "Oxweld," "Prest-O-Lite," "Prest-O-Weld," "Purox," "Union," and "Unionmelt" are trade-marks of Union Carbide and Carbon Corporation or its Units.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 E. 42nd St., New York 17, N. Y. UCC **Offices in Other Principal Cities**

In Canada: Dominion Oxygen Company, Limited, Toronto



WE MAKE WIRE BEHAVE

the way you want it to!

TODAY, wire is called upon to perform in innumerable ways. Developing it and controlling its behavior has become an exacting science at Worcester Wire Works. For here we have only one specialty, and *that's it* . . . the scientific development and production of fine wire, to meet new, unusual or tough requirements with precisely correct behavior.

For example, Worcester Wire Works engineers have painstakingly developed high carbon brush wire for removing rust, scale and metallic burrs, and for other severe industrial uses. Its carefully engineered combination of high tensile, hardness, maximum resistance to abrasion and good *cutting* qualities make it an exceptional performer in high fatigue operations. At the other extreme, brush wire for polishing and buffing has been engineered for *soft* finish, but again with peak wear-resistance.

In contrast, safety pin wire must not only take the severe punishment of fabrication—fast 180° bends without signs of cracking—but must have precisely the right hardness to form properly and still have the required rigidity.

Yes, we make wire behave the way you want it to—from safety pins and bob pins to piano wire and delicate springs. It may be a wire with distinctly new characteristics. It may be one that has already been developed during our many years of fine wire specialization.

In any case, Worcester Wire Works engineering service is always available to you—right now if you wish—ready to tackle and lick any wire problem you may have.

NS
WORCESTER
WIRE WORKS
Division
NATIONAL-STANDARD COMPANY

DIVISIONS OF NATIONAL-STANDARD COMPANY

WORCESTER WIRE WORKS
Worcester, Mass.
Round Steel Wire, Small Sizes

NATIONAL-STANDARD
Niles, Mich.
Tire Wire, Fabricated Braids and Tape

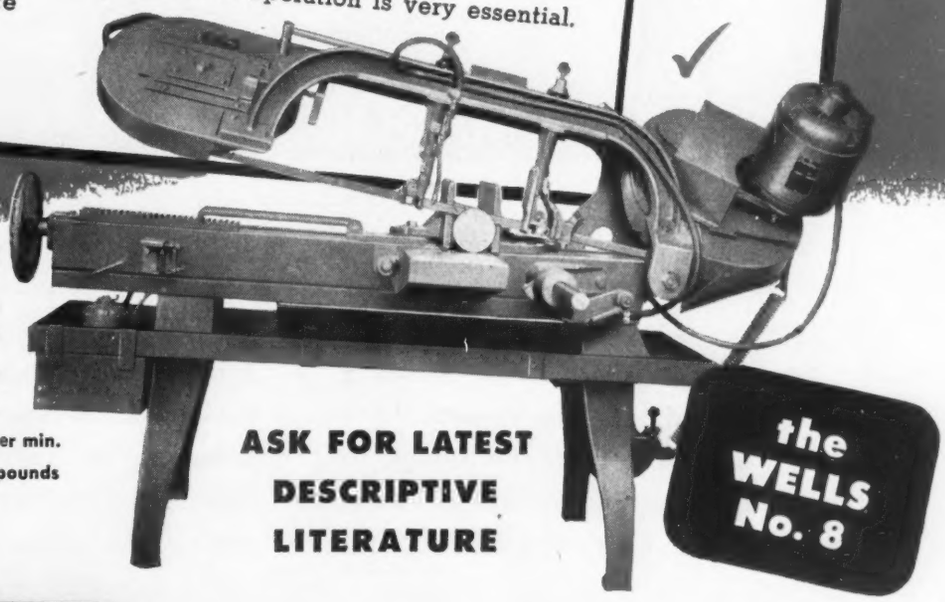
ATHENIA STEEL
Clifton, N. J.
Cold Rolled, High-Carbon Spring Steel

WAGNER LITHO MACHINERY
Jersey City, N. J.
Lithographing and Special Machinery

Tips on how to select a metal cutting saw

... use this Check List

Features YOU Want:	WELLS
• **VERSATILITY.** You want a saw that will cut various materials —metals . . . fibers . . . plastics—in a variety of shapes—rounds . . . bars . . . sections. *Wells gives this to you!*	✓
• **SIMPLICITY.** Ease of operation and simplicity of design are good general rules for all equipment. *Wells has both.*	✓
• **PORTABILITY.** Being easy to move is a desirable feature for machine tools. *Wells can be moved to any spot.*	✓
• **DEPENDABILITY.** You want a machine that will operate, even under hard usage. *Wells saws stay on the job!*	✓
• **MODERN DESIGN.** Modern design gives you maximum efficiency. *Wells saws have been tested and approved by thousands of users.*	✓
• **REASONABLE COST.** Low cost of operation is very essential. Wells saws are economical.	✓



specifications

Capacity	8" x 16"
(Special Guides) . .	5' x 24"
Rounds:	8" Diameter
Motor: . .	½ H. P., A.C. or D.C.
Speeds:	Selective 60, 90, 130 ft. per min.
Weight: .	Approximately 665 pounds

ASK FOR LATEST DESCRIPTIVE LITERATURE

the WELLS No. 8

Wells SAWS
THE SIGN OF SERVICE

Wells

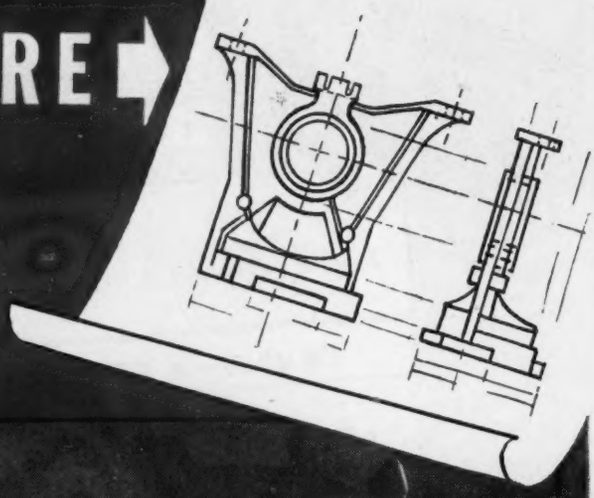
Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN

The help we give you HERE will save you money

HERE



While the designs for aluminum die castings you'll need months from now are still sketches on the drawing board . . . *this* is the time to call in the Alcoa die castings experts. They can help you get all the benefits of strength and light weight from aluminum die castings. They can show you how to simplify designs to reduce costs of parts.

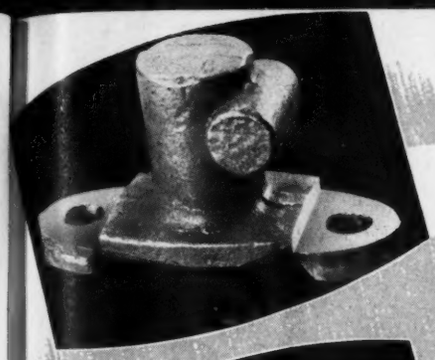
Our engineers will be glad to discuss your die castings problems with you. Write to ALUMINUM COMPANY OF AMERICA, 2112 Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in leading cities.

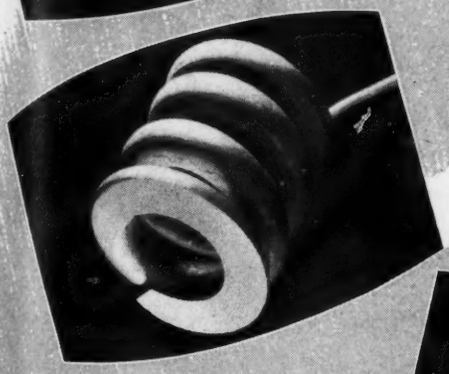
MORE people . . . want MORE aluminum . . . for MORE uses than ever

ALCOA FIRST IN ALUMINUM

ALCOA ALUMINUM

IN EVERY COMMERCIAL FORM





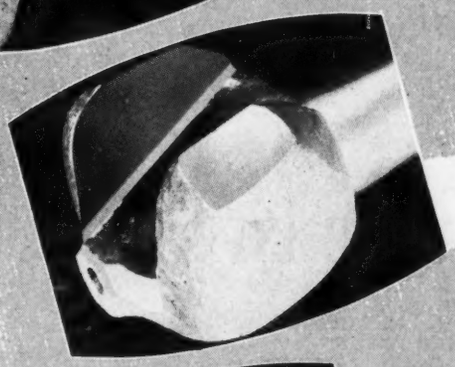
economical

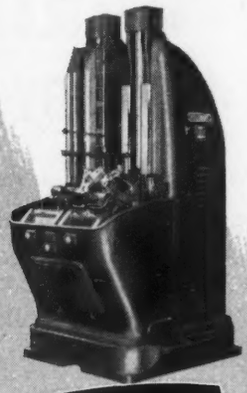
FOR HIGHER PRODUCTION

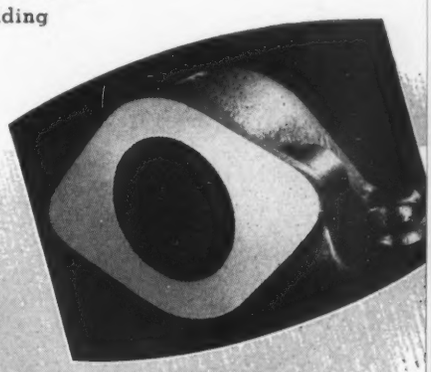
Higher production can be attained on many parts at less cost per piece through the adoption of Footburt Surface Broaching. These machines usually produce as fast as an operator can load the fixtures. Tool maintenance cost is low, as the slow cutting speeds make it possible to machine an exceptionally large number of pieces between grinds. May we advise you on the application of Footburt machines on your work.

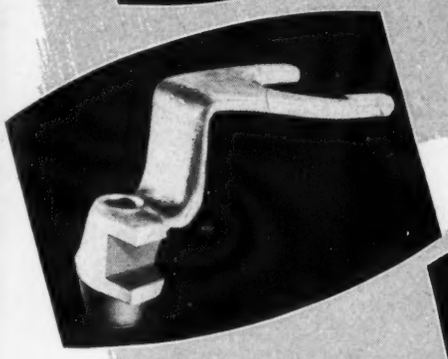
THE FOOTE-BURT COMPANY • Cleveland 8, Ohio

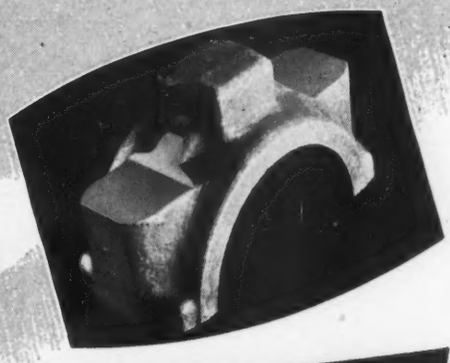
Detroit Office: General Motors Building











FOOTBURT *Surface Broaching*

FOOTBURT PATENTED TOOTH FORM

Fine Quality Steel

TAILOR-MADE BY GRANITE CITY

This is Middle America — the area in which manufacturers who require fine quality steel, tailor-made to their own particular specifications, buy from Granite City.

Granite City Steel Company has, since 1878, expanded its facilities to permit the use of the most modern production methods developed by the steel industry . . . yet has always remained small enough to permit the scrupulous attention to manufacturing detail that results in steel of the finest quality . . . steel that bears the trademark of Granite City.

Granite City Steel Company

GRANITE CITY, ILLINOIS

Chicago • Cleveland
Houston • Indianapolis
Kansas City • Los Angeles

SINCE
GRANITE CITY STEEL
1878

Milwaukee • Memphis
Minneapolis • Moline
New York • St. Louis

HOT ROLLED SHEETS • COLD ROLLED SHEETS • STRIPLATES • STAINLESS-CLAD • TIN PLATE
TERNE PLATE • ELECTRICAL SHEETS • TIN MILL PRODUCTS • PORCELAIN ENAMELING SHEETS

Blasting Away

WITH ALL 3 BARRELS . . .
TO LOWER THE COSTS OF CLEANING

When Lynchburg Foundry Company installed its new mechanized molding unit (automatic wherever practical), it became necessary to replace its tumbling mills with cleaning equipment capable of keeping pace with the faster molding. Pangborn's ROTOBLAST* Barrel was selected—with twenty-five hundred to five thousand pounds capacity.

Results justified the choice. Cleaning kept pace . . . breakage virtually vanished . . . finishing time per piece was cut to a fraction.

So—another ROTOBLAST Barrel was installed (and a Pangborn Air-blast Room for the larger pieces). Recently—a *third* ROTOBLAST Barrel was ordered.

Now? Blast-cleaning output averages 160 tons a day, with 200 tons not unusual. Lynchburg Foundry—with quality and costs in balance—faces the future with confidence!

For you—the ROTOBLAST method offers equally important advantages. Investigate ROTOBLAST—barrels, tables, special machines. Write Pangborn—*world's largest manufacturer of blast cleaning and dust control equipment*. Pangborn Corporation, 1298 Pangborn Boulevard, Hagerstown, Maryland.

*Trademark of the Pangborn Corporation

Pangborn ROTOBLAST Cleaning Barrel shown at shake-out end of mechanized molding loop.

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

BLAST CLEANS CHEAPER WITH THE RIGHT EQUIPMENT FOR EVERY JOB

Something New!

*PAT. APPLIED FOR

IN TUBING FABRICATION...

Here's a real demonstration of severe fabrication which can be performed efficiently and economically on modern Republic ELECTRUNITE Tubing. Expanding, tapering and rolled-in threading are the operations involved in making this coupling for oil field shot hole casing—an application in which fast assembly, high joint strength and ease of dismantling are of primary importance. • ELECTRUNITE Tubing was selected for this application because extensive laboratory tests proved it to be ductile enough for greatest fabricating economy, yet strong enough that the rolled-in threads would resist up to 18,000 pounds pull. • In this, as in countless other cases, ELECTRUNITE Tubing proved that its only limitations are those of the equipment on which it is fabricated. Whatever your tubing problems, it will pay you to investigate the many advantages of ELECTRUNITE, in a wide size range of carbon, alloy and stainless steel analyses. Complete information on request.

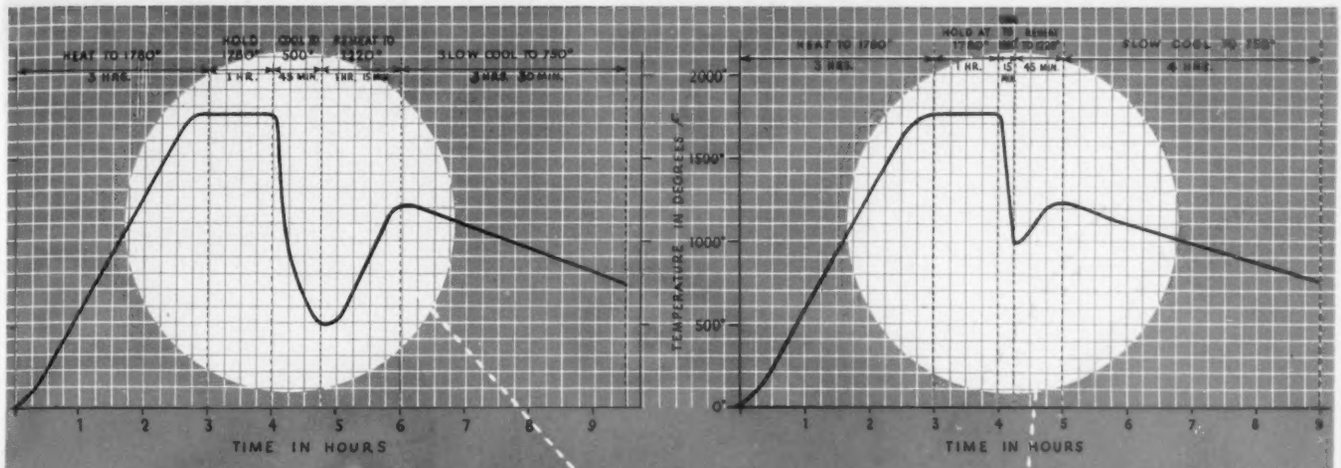
REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

*Photo Courtesy of Komp Equipment Co.

MID AMERICA EXPOSITION CLEVELAND

REPUBLIC STEEL REG. U. S. PAT. OFF.

Republic ELECTRUNITE TUBING



SELECT YOUR FURNACE LENGTH—

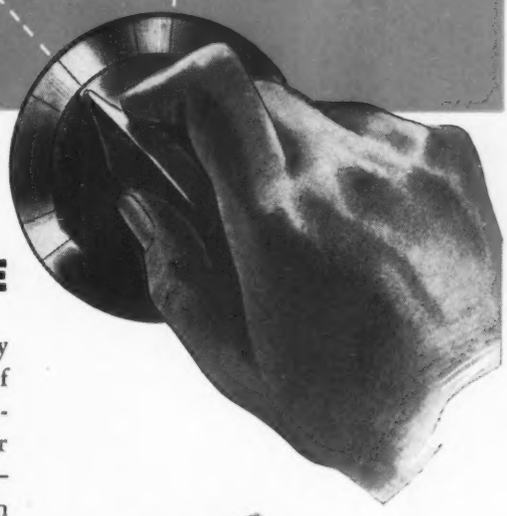
DIAL YOUR COOLING CYCLE—

with the turn of a switch!

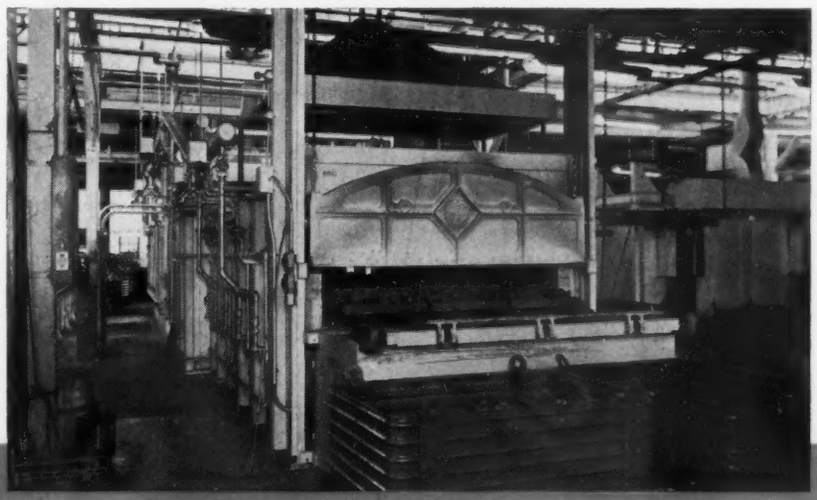
HAGAN

Automatic

CYCLE ANNEALING FURNACE



Maintain constant production—constant pushing intervals—yet vary your cooling cycle over a range of more than 1100°F. with a turn of a switch. This *exclusive* feature of the Hagan Automatic Cycle Annealing Furnace permits variable quick cooling of forgings or castings from furnace temperature down to 500°F. *in the furnace*—not outside in room atmosphere. For advanced engineering in industrial furnace applications—check *first* with Hagan.



SAME Furnace

SAME Production

SAME Pushing Interval

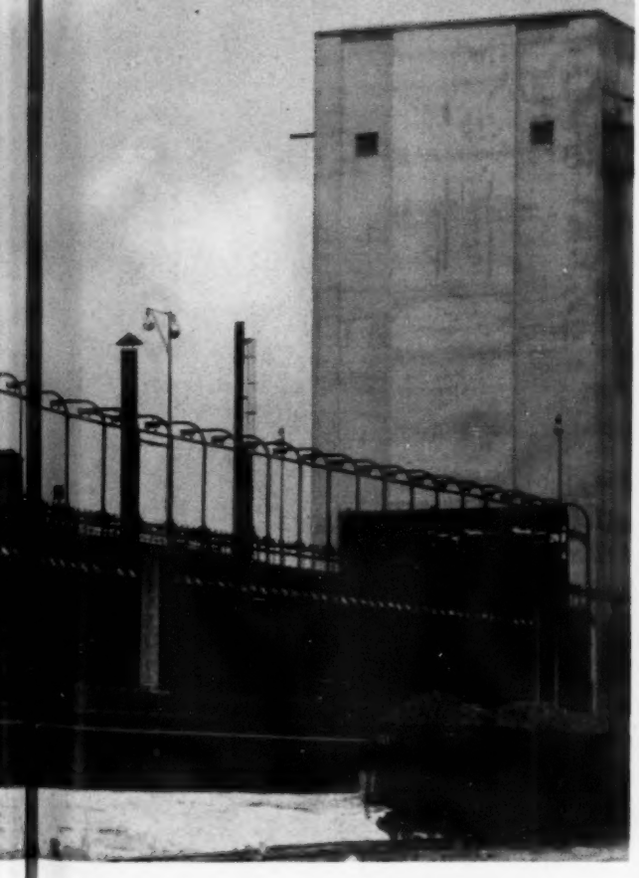
DIFFERENT Cycles at will!

HAGAN — INDUSTRIAL FURNACES FOR ALL PURPOSES

GEORGE J. HAGAN COMPANY • PITTSBURGH, PA.

DETROIT CHICAGO LOS ANGELES SAN FRANCISCO

6 Reasons why Your Coke Oven Plant should be built by Koppers



Koppers-Becker Low-Differential Coke Ovens with Waste-Gas Recirculation are the most advanced ovens available and they have these advantages:

1. They make the best possible grades of domestic and metallurgical coke from suitable coals under widely-varying conditions with the least underfiring requirements, and the highest yields of byproducts.

2. They can be built (without interference with the uniformity of heating) in oven capacities up to 20 net tons of coal per oven charge, in small or large batteries, to suit local conditions.

3. They can be underfired efficiently with coke-oven gas, natural gas, blue gas, carburetted water-gas, propane, butane, high-B.t.u. refinery gas, producer gas or blast-furnace gas, producing uniformly heated coke over a wide range of coking times.

4. They are built of the best materials available and of sturdiest design; are free from complications; are simple to control, and accessible throughout, insuring low maintenance cost and long life.

5. They can be operated at high speed with greater safety and at lower flue-temperatures because of the action of the waste-gas recirculation system.

6. By means of a separate and efficient blast-furnace-gas-enriching system, they can be operated to produce as much coke when underfired with low-B.t.u. blast-furnace gas as when underfired with coke-oven gas with the least requirement of high-B.t.u. coke-oven gas for enriching.

Koppers engineers will be glad to work with you on your plans for coke oven plants, light oil plants, by-product plants, gas-purification systems, gas producers, precipitators and any other equipment or apparatus connected with coal carbonization.

K
KOPPERS

KOPPERS COMPANY, INC.

KOPPERS BUILDING, PITTSBURGH, PA.

Here, your Spring gets

-Point Production Analysis

for SIZE OF ORDER

for UNIFORMITY (if repeat order)

for PROPER TOOLING

for SPECIALIZED MACHINERY

. . . Springs made by Wallace Barnes are job-engineered—appraised for those specifications which, if not properly anticipated, may result in extra operations which naturally means extra cost. By use of specialized departments, ingenious machines and toolmakers with experience and imagination, operations are reduced to a minimum consistent with quality and quantity desired. Wallace Barnes job-engineering, working simultaneously with your design-engineering, should result in the greatest production economy and the best spring for your purpose.

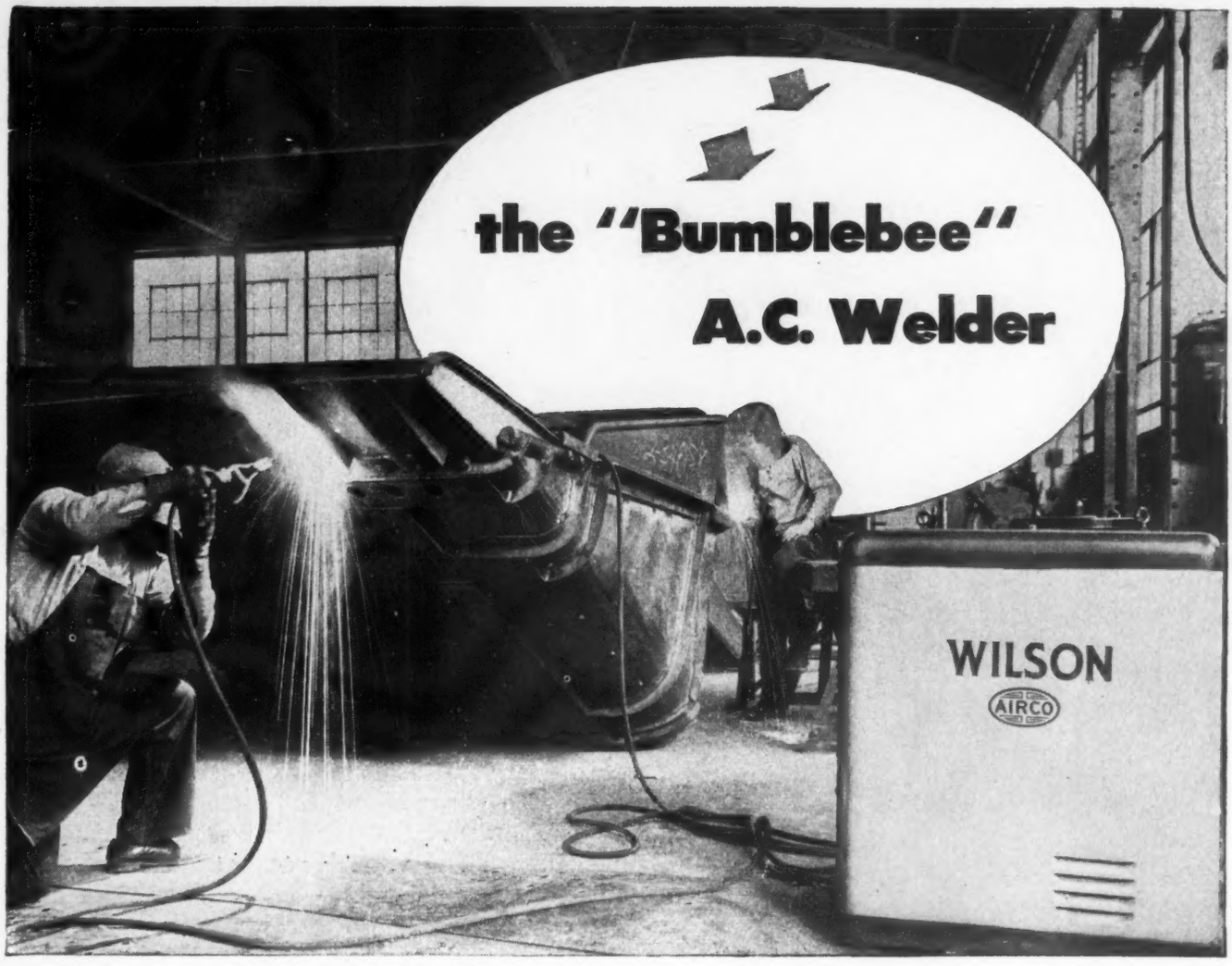
Wallace Barnes SPRINGS

SMALL STAMPINGS • WIRE FORMS • HAIRSPRINGS • COLD ROLLED SPRING STEEL

WALLACE BARNES COMPANY
BRISTOL, CONN.

DIVISION OF THE ASSOCIATED SPRING CORP.

AND IN CANADA, THE WALLACE BARNES CO., LTD., HAMILTON, ONTARIO



GIVES YOU All These Important Operating Features

1. **WIDE CURRENT RANGE** from 30 to 275 amperes for the 200 ampere model; 60 to 375 amperes for the 300 ampere machine; and 100 to 625 amperes for the 500 ampere type.

2. **IMPROVED ELECTRICAL EFFICIENCY** at rated load of 84½%, 81% and 83%, respectively for the 200, 300 and 500 ampere sizes is provided.

3. **LOW OPEN CIRCUIT VOLTAGE** (75 volt) works to greater advantage on new AC electrodes and gives perfect ease of welding.

4. **VASTLY IMPROVED POWER FACTOR** virtually eliminates the penalty charge of low power factor, and permits the use of smaller primary cables, line switches and fuses. This feature also permits the operation of more welders from existing feeders without causing overload.

5. **QUIET OPERATION** because there are no rotating parts in the circuit design. The Wilson "Bumblebee" is almost silent in operation.

6. **MINIMUM MAINTENANCE** because its operation involves no moving parts with the exception of the fan.

These plus values inherent in the advanced design of Wilson "Bumblebee" arc welders make possible *better quality welding with a reduction in power consumption.*

AIRCO AIR REDUCTION

Offices in All Principal Cities

Headquarters for Oxygen, Acetylene and other Gases . . . Carbide . . . Gas Welding and Cutting Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories

For more information about the complete line of Wilson "Bumblebee" A. C. welders, fill in the coupon below. Send it to: Air Reduction, General Offices, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, General Offices, Houston 1, Texas. Represented Internationally by Airco Export Corporation.

AIR REDUCTION S
60 East 42nd Street
New York 17, N Y.

Send me copy of your catalog ADW-53.

Firm_____

Signed by_____

Address_____

City_____ Zone____ State_____

Platinum and palladium are melted in 3- and 5-lb. furnaces. At left is converter.

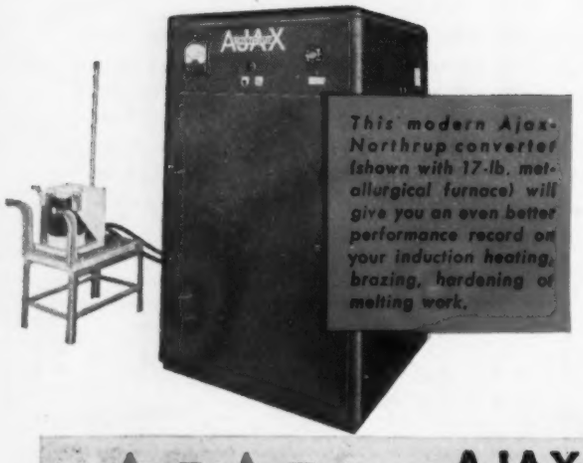
Gold!

HUNDREDS OF TONS OF IT

MELTED WITH NEGLIGIBLE LOSS AT KASTENHUBER & LEHRFELD, INC.

That's the 21-year record of a still-good Ajax-Northrup 20 kw. spark-gap converter at Kastenhuber & Lehrfeld, Inc., New York refiners. Tons of platinum and tons of palladium have also been melted in this unit with losses characterized as negligible, and with low equipment maintenance.

"Once you get the technique worked out," says K & L, "even the toughest melting problems are reduced to routine with Ajax-Northrup's close control." Seven interchangeable furnaces from 3 lbs. to 60 lbs. capacity are used. 1600 ozs. of gold are melted in less than 40 min. at half-power. Life of Norbide crucibles is about 150,000-250,000 ozs. of gold. The metal pours slag-free, with no heel whatever left in the pot. 160 ozs. of platinum are melted in 20 min. The company has just installed a second Ajax-Northrup converter.



This modern Ajax-Northrup converter (shown with 17-lb. metallurgical furnace) will give you an even better performance record on your induction heating, brazing, hardening or melting work.

USE AJAX-NORTHRUP MELTING FOR ALL EXACTING WORK

You may not be melting gold, but you'll find Ajax-Northrup melting is ideal for all close-analysis melting of alloy steels and other ferrous and non-ferrous metals, because there's no contamination, negligible loss of costly ingredients, and constant electro-magnetic stirring. Just tell us what you want to do, and we'll tell you how.

105

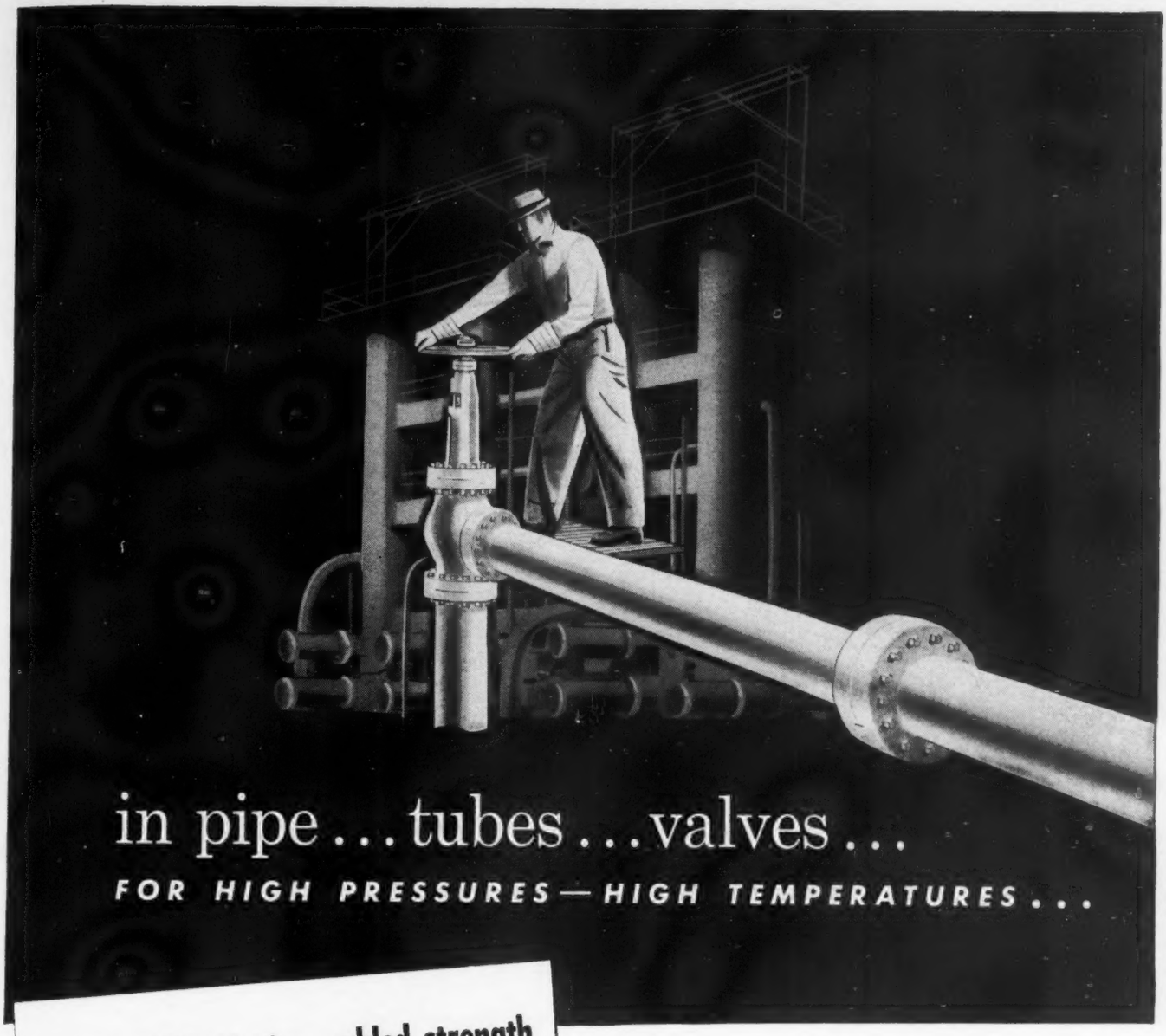
AJAX NORTHRUP
SINCE 1916

AJAX ELECTROTHERMIC CORP.
AJAX PARK, TRENTON 5, N. J.

ASSOCIATE COMPANIES
AJAX METAL COMPANY • AJAX ELECTRIC CO., INC.
AJAX ELECTRIC FURNACE CORP. • AJAX ENGINEERING CORP.

AJAX

HIGH-FREQUENCY HEATING-MELTING



in pipe . . . tubes . . . valves . . .

FOR HIGH PRESSURES — HIGH TEMPERATURES . . .

MOLYBDENUM gives added strength to wrought or cast ALLOYS . . .

In equipment for producing aviation gasoline and synthetic rubber . . .

In gas turbine and jet-propulsion engines for marine or aeronautical use . . .

In many of the most exacting applications, pipe, tubing, valves, controls, heat exchangers are fortified against high pressures, high temperatures or both by employment of Molybdenum-alloyed steels and irons.

Very small additions of Molybdenum, either alone or combined with other alloying elements in exactly right proportions, impart the physical properties for newly developed requirements.

On these and other uses of Molybdenum, Tungsten and Boron, the Molybdenum Corporation has informative literature and invites correspondence.

MASTER CRAFT ALLOYS

AMERICAN Production, American Distribution, American Control, Completely Integrated.

Offices: Pittsburgh, New York, Chicago, Cleveland, Detroit, Los Angeles, San Francisco, Seattle.

Sales Representatives: Edgar L. Fink, Detroit; Brumley-Donaldson Co., Los Angeles, San Francisco, Seattle.

Subsidiaries: Cleveland-Tungsten, Inc., Cleveland, O.; General Tungsten Mfg. Co., Inc., Union City, N.J.

Works: Washington, Pa.; York, Pa.

Mines: Questa, New Mexico; Urad, Colorado.

MOLYBDENUM

CORPORATION OF AMERICA

GRANT BUILDING PITTSBURGH, PA.

MCA

NCG is recognized as one of the largest organizations of its kind in the world. It operates 73 manufacturing plants within the United States, offers supply from more than 700 warehouse stocks and service by a vast network of hundreds of independent NCG distributors. For assured satisfaction in *your* welding and cutting needs . . .

RELY ON NCG

Three Sources of SAFETY

In the NCG *Rego* Two-Stage RegOlator there are *three* perfected features to protect the operator, the regulator and the torch in the handling of high pressure gases. Any one of these devices affords normal safety but taken together they make assurance triply sure.

First, the body is an extra-strong heavy forging. Second, the cartridge filter... put there to screen out rust, dirt and dust... also does a full job of compression-heat absorption and radiation. Finally there is a foolproof valve that automatically relieves any excess of pressure... and automatically reseats itself.

These features are provided just so the *Rego* RegOlator can *start* to do its job properly. Carefully selected materials and precision-made working parts assure long-life, dependable performance with complete safety through that longer life.

Adjustments are made with ease and certainty. The adjustment screw is of large diameter and moves on a thread designed to permit delicate and sensitive settings. Other features contribute to fractional pound accuracy and sensitive adjustment including the lowest ranges.

Once a setting is made, *Rego* RegOlators maintain pressures without variation. The welding flame will not turn oxidizing or carbonizing on pressure drops. Generously proportioned, correctly profiled gas passages pass large volumes of gas freely, assuring efficient emptying of cylinders.

The same broad-gauge engineering is maintained in *Rego* Single-Stage Regulators and you are invited to send for bulletin NR-151A which describes both single and two-stage regulators.

NCG

EVERYTHING FOR WELDING

NATIONAL CYLINDER GAS COMPANY · 205 W. WACKER DRIVE · CHICAGO 6, ILL.

CLEANS—PAINTS—BAKES

Complete cleaning, painting, dipping, baking system for radiators, casings, machine parts, etc.

PLANT ENGINEERING: *Consulting assistance in plant layout to coordinate departmental operations, our experience dated from 1917 in this field.*

Such plant layout may be based on increasing production beyond present capacity, or it may be a rearrangement in this post-war period when operations are conducted under a new set of conditions.

MOTOR CLEANING EQUIPMENT: *Washing machines for cleaning tear-downs. Kerosene spray or similar solvent usually used as the cleaning medium.*

FORMED COWLINGS, PANELS, ETC.: *To your specification, and of light metal alloys as required. Weldments and brazed assemblies may be under controlled atmosphere.*

PILOT EQUIPMENT: *Sample size equipment for development of heavy equipment.*

VERTICAL CORE BAKING MACHINES • CONTINUOUS HORIZONTAL BAKING OVENS • BATCH TYPE CABINET OVENS • DRAWER OVENS

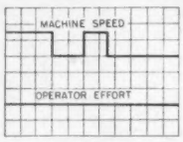
DETROIT SHEET METAL WORKS, 1296 OAKMAN BOULEVARD, DETROIT 6, MICHIGAN

DETROIT SHEET METAL WORKS

DETROIT -6- MICHIGAN

HALT RISING PRODUCTION COSTS with these *electronic* controls

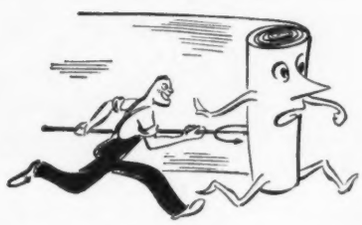
CHANGE MACHINE SPEEDS INSTANTLY, EASILY—WITH THY-MO-TROL* DRIVE



It's as easy and quick as adjusting the volume control on your radio. And once the machine is set for correct speed it stays there, even while going from no load to full load, because the electronic circuits compensate for fluctuating loads. Result: maintained production and improved quality of output despite load changes. Thy-mo-trol drive includes electronic panel, d-c motor, transformer, and small control station. Operates on a-c power. Standard sizes from 1/8 to 25 hp. Many uses, such as driving drill presses, grinders, lathes, conveyors.

**G.E.'s trademark for motor control using electronic tubes.*

Make Moving Webs Run True



When a moving web must be guided through a manufacturing process, it is usually important to keep the lateral position of the strip in a given relation to the processing machine. If lateral position is not maintained, waste mounts, production decreases and costs soar. G-E side-register control automatically keeps the web in correct lateral position. This device is ideally suited for application on slitting, rewinding and side-trimming machines. Bulletin GEA-4410.

Let the "Eye" Do Your Counting and Sorting

Some of the most tedious jobs in your factory which have required constant attention from workers can easily be taken over by photoelectric relays. Because only a beam of light touches the object being counted or sorted, fragile parts or freshly painted pieces are not harmed. Equipment consists of a light source and an electronic relay, which can very easily be mounted over a conveyor. These relays are also useful for many inspection jobs which may be tying up essential workers. Bulletin GEA-1755.

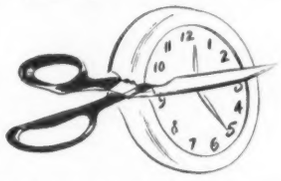
PROPER CUT-OFF IS ESSENTIAL IN PACKAGING

Poor cut-off register on imprinted wrappers and packages can spoil the appearance of your product and destroy its sales appeal. Constant vigilance by the packaging-machine operator can reduce, but never *prevent*, misregister. Electronic register control prevents misregister, and no rejects occur. G-E cut-off register control instantaneously compensates for draw-roll slippage, web stretch and shrinkage, and web speed variations in relation to the cutter. Check Bulletin GEA-4371 for full details.

To time processes rapidly, accurately, automatically

●You'll find many tasks that these small, sturdy, dependable electronic timers can take over and thus release employees from tedious jobs. Five forms cover easily adjusted timing ranges from 0.045 second to 2 minutes. Hundreds are in use on mixing machines, grinders, conveyors, sign flashers, riveters. Several timers can be combined to cover a sequence of operations. Electronic timers are easy to install and economical to operate. Only one moving part—means long life and low service cost. Bulletin GEA-2902.

Cut assembly time on small parts



Thyratron control for low-capacity, bench-or-tong, spot welders will speed small-parts fabrication such as welding solid or stranded conductors to terminals, or welding electronic tube elements. These alert, accurate controls have recorded a two-to-one advantage over soldering and riveting. Rejects drop to a new low because of the accuracy and split-cycle response of these controls. They are designed for either 230- or 460-volt, 60-cycle operation, and are rated 77 amperes peak on a duty cycle not exceeding 10 per cent. 50-cycle equipment is also available. Check Bulletin GEA-4175A.

IT'S easier to "keep everything under control" when you turn over many of the routine, mechanical jobs to reliable, economical, electronic control equipment. New operators can be trained more quickly, experienced workmen can be released for supervisory or other more important jobs. Often the addition of electronic control makes equipment more productive and helps prevent waste of materials. Production is not only simplified, but it is speeded as well, and costs are reduced.

Our engineers have a wide experience in designing and adapting electronic equipment. They may be able to make valuable suggestions on how electronic control can improve your operations. All you need do is call our nearest office, and we'll work with you from then on.

INDUSTRIAL ELECTRONICS MADE EASY . . . VISUALLY

What goes on inside a vacuum tube? How does it function in a circuit? How can its life be prolonged? These and many other questions about industrial electronics are answered simply and interestingly in a new sound slidefilm training course, part of General Electric's MORE POWER TO AMERICA program. The course is designed to teach even non-technical personnel the elements of electronics. It comes complete with 12 slidefilms and records, 300 review books, instructor's manual and carrying case. Your employees can learn faster and remember what they learn longer with this easy-to-understand talking slidefilm. Bulletin GES-3303A.

General Electric Company, Section E685-25
Schenectady 5, New York

Please send me the bulletin(s) checked below:

- ☐ GEA-4410 (Side-register control)
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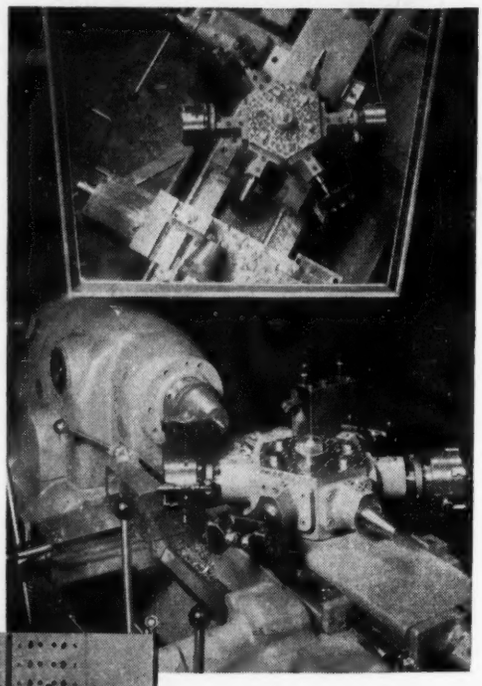

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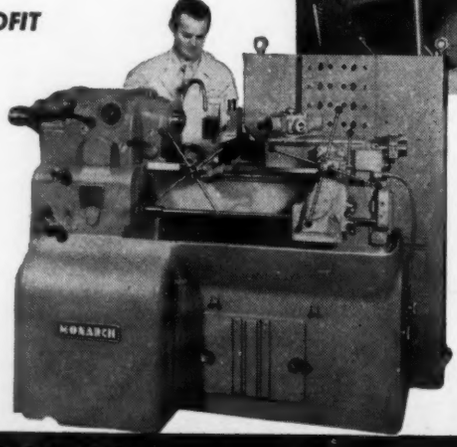

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Business Staff on Page 4

NEXT WEEK . . .

Chrome-Moly Electrode Welds
High Temp Steels for Gas Turbines
Drawing Steel with Zinc Alloy Dies
Coolants for Working Metals
Manufacture, Selection, Use of Files

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 120, NO. 20 MAY 19, 1947

NEWS

★ As the Editor Views the News 49
Steel Lack Curbs Shop Operations 53
Labor Reform Bill Shaped by Senate and House Conferees 55
★ Present, Past and Pending 55
Mill Supply Men Warned To Gear Activities to Buyers' Market 56
Warehousemen Discuss Problems 58
Diesel Production To Set Peacetime Record in 1947 60
Supreme Court Upholds Freight Rate Equalization 61
WAA To Donate Surplus Tools for Public Use 61
★ Windows of Washington 62
Army Investigates Feasibility of Underground War Plants 65
Steel Stairs for Housing Project 65
Production of Steel, Pig Iron in Europe Rises 66
British Steel Industry's Plans for Modernization Progressing 67
★ Mirrors of Motordom 69
Cleveland-Cliffs Now Operating Sixteen Mines 72
★ Briefs 73
★ The Business Trend 74
★ Men of Industry 76
★ Obituaries 81
★ Construction and Enterprise 164

TECHNICAL

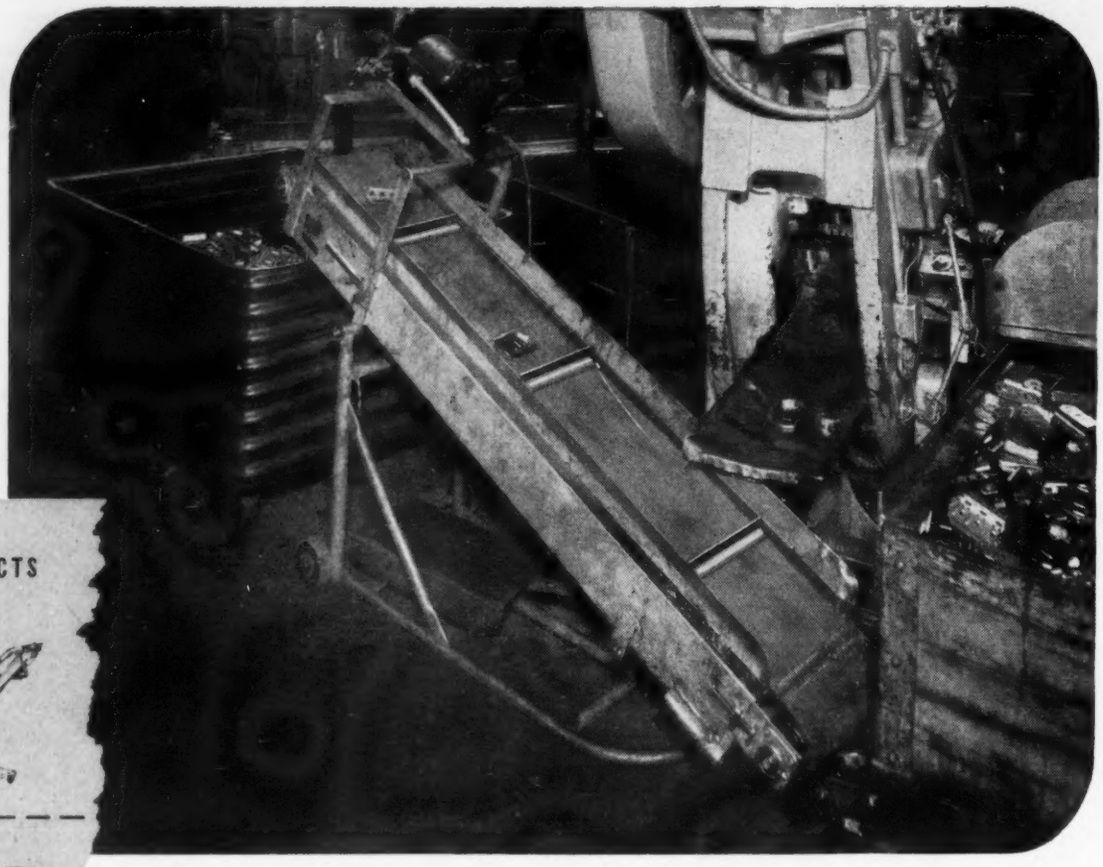
Composition, Control and Selection of Coolants for Working Metals .. 82
Electrolytic Polishing and Lapping for Mirror Finishes 84
Spot Welding Primary Structures of Giant Aircraft 88
★ Seen and Heard in the Machinery Field 89
Manufacture, Selection and Use of Files—Part II 90
★ Engineering News at a Glance 94
Automotive Cylinder Bore Size Automatically Controlled 96
Packaging Expert Helps Railroad Reduce Freight Losses 99
Rapid Determination of Tin in Copper Base Alloys 102
Space-Saving Shift Moves Large Finishing Ovens to Plant Roof 107
★ Progress in Steelmaking—Oxygen Enriched Blast 110
Air Scanning Simplifies Irregular Contour Work 114
★ New Products and Equipment 135
★ Helpful Literature 139

MARKETS

Supply Conditions of Some Products Seen Easing Soon 142
★ Market Prices and Composites 142
Crane Says Metal Prices Are Too High 146

★ *Index to Advertisers* 172

★—Denotes regular features.



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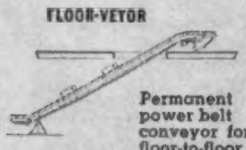

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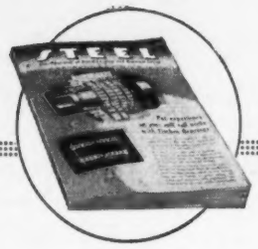


May 19, 1947

Industry Relations

A noticeable characteristic of the programs of many of the industry conventions being held during the current season is the strong emphasis placed upon labor relations and public relations.

This is not surprising because these are timely topics. Of the two, labor relations seems to have priority, probably because there is an urgency in managements' relations with employees that does not brook evasion or delay. The fact that improper attention to this problem can easily lead to an abrupt stoppage acts almost automatically as a spur to company executives to maintain labor relations at a high level of efficiency.

It is unfortunate that there is not a similar incentive for management to maintain good public relations. The attitude of the people toward industry or toward a company seldom is manifested by direct action. Public opinion is subtle and usually it acts slowly. For this reason it is easy for management to underestimate the importance of the time element in public relations.

Realism should indicate that no time should be lost in correcting the false impressions that have been acquired by the average citizen in regard to American industry and to the economy of which it is a vital part. Numerous surveys show that the public has an exaggerated idea of the profits earned by corporations and is badly informed on many other matters regarding industry. Unless the voters of the nation become better informed on these subjects there is danger that they will repeat the mistake that the people of Great Britain and other nations have made in changing to a form of government that is inferior to the one they had but did not appreciate. Industry shares with other constructive forces in the nation the responsibility of demonstrating the superiority of the American system so convincingly that the people will renew their zeal to preserve it. This calls for better public relations starting immediately.

Industry has another relations job that is especially important now. It is to improve relations between industries and between groups within industries. In the current confusion, too many groups are antagonistic toward other groups. This inter-industry feuding is futile, costly, and in most instances, unnecessary. It can be eliminated easily, if the participants will devote to the job of trying to understand each other's problems the same skill and patience they are devoting to labor relations.

Good industrial relations all along the line should be the new order of the day.

• • •

HANDWRITING ON WALL: While the final outcome of congressional action on labor legislation will not be known until the House and Senate bills are reconciled and the President has vetoed or approved the resultant document, it is clear that both houses have responded quite faithfully to the apparent desire of the American people to curb some of the more flagrant abuses of existing labor laws.

Union labor leaders and the members of unions will be blind indeed if they fail to recognize the overwhelming majorities by which labor curbs have been initiated. The 68 to 24 vote in the Senate following on the heels of a decisive vote in the House on an even more drastic bill, and taken in conjunction with President Truman's signing of the bill that outlaws most portal-to-portal claims, should convince every earnest union official that the nation is united in its determination to stamp out some of the bad labor practices of the past.

There is talk of some kind of a demonstration by unions in protest against the new legislation. Calm union leadership should counsel that such a public protest would be a mistake. A far better strategy

(OVER)

would be for union leaders to realize that this legislation is mild in relation to the provocations that prompted it and to start now to try to rewin public confidence in unions. —p. 55

° ° °

ROUGH GOING: Acute steel shortages, especially flat-rolled products, have forced temporary curtailment of some metalworking operations. The automotive industry appears most severely affected, car output dropped to around 70,000 last week from over 93,000 the week preceding and more than 100,000 the week before that. Stamping plants and other metalworking shops also report rough going.

What is the answer to the riddle of short supply? Steel is moving into consumption at a record-breaking peacetime rate. March shipments were the largest since May, 1945, the month the German military machine collapsed. Should the March rate of sheet and strip shipments be maintained the 1947 movement of these products will attain the record total of over 18 million tons, 28 per cent greater than in 1946 and 12 per cent above 1941.

The immediate future outlook, while disappointing, is not wholly devoid of cheer. As the months pass there is reason to expect some easing in supply conditions, even in sheets and strip. More cautious buying already is in evidence and it would not be surprising if gaps appeared in mill rolling schedules permitting insertion of tonnage now crying for placement. Washing out of much duplicated tonnage, now on mill books, is certain should this new buying mood continue. This will help considerably. —pp. 53, 69

° ° °

MIRROR FINISHES: Since 1935, when electrolytic polishing and lapping were first reported, these methods of producing mirror finishes on many metals have been developed into important tools for both metal finisher and metallographer. While it is not anticipated that the processes will replace conventional mechanical or abrasive polishing, they have become useful complements to mechanical methods.

Producing rapid results, the brush method is particularly useful in polishing small areas of massive objects or portions of intricately shaped parts which are inaccessible to buffs or polishing wheels. Electrolytic lapping, studied at Frankford Arsenal in connection with metallographic work, yielded true microstructures because surfaces were free from a layer of "flowed" or worked metal.

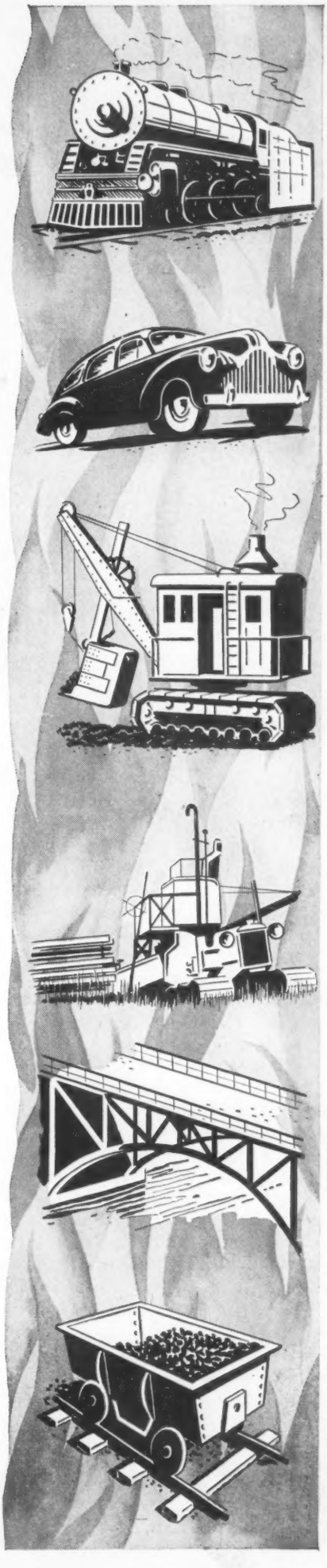
Future experiments will determine the full sphere of usefulness of the electrolytic techniques. —p. 84.

SIGNS OF THE TIMES: Both Senate and House have approved labor reform bills by majorities that indicate proponents of such legislation have sufficient power to override a possible Presidential veto (p. 55). Final bill will avoid extremes but will provide many long-needed restrictions on the unions. Some old-time labor leaders claim (p. 64) that effectiveness of the law will be postponed for several years by legalistic assaults on its provisions . . . . Significant progress is being made by the military services (p. 62) in obsoleting weapons of the last war and replacing them with more modern equipment. Much of this work remains under wraps but enough information is available to give metalworking companies an inkling of what they will be called upon for in event of another emergency . . . . Yearly freight loss and damage payments by the nation's rail carriers have been ranging in the neighborhood of $80 to $100 million. In an attempt to reduce such losses for its lines, Union Pacific Railroad (p. 99) is making effective use of a packaging expert who advises shippers, freight inspectors and others engaged in expediting shipments . . . . A Tennessee appliance company has discovered that by moving its two finishing ovens to the plant roof, it acquires 10,000 sq ft of additional floor space for production. Parts are fed into the roof ovens (p. 107) by means of conveyor lines. . . . Standard practice in automotive plants is to manufacture and stock pistons in a range of sizes. As engine blocks arrive at the assembly line, each cylinder is gaged and a piston selected to fit it. To reduce selective fitting of the pistons, Micromatic Hone Corp. (p. 96) has developed a honing tool and head that controls automatically the finished bore size. The equipment removes 0.004-in. stock from each bore in 30 sec, corrects out-of-roundness and taper, holding bore-to-bore size within a limit of 0.0005-in . . . . To speed disposal of surplus machine tools, the War Assets Administration will donate to government institutions and other nonprofit organizations tools which have been offered but not sold at fixed price to priority claimants and commercial buyers (p. 61) . . . . Interstate Commerce Commission now may put into force new "class" freight rates designed to end sectional inequalities (p. 61), following a Supreme Court ruling upholding the action . . . . Diesel engine production is headed for a new peacetime record in 1947, according to an industry spokesman (p. 60), who attributes the gain to a swing toward diesel-powered units for water and rail transportation.

E. L. Shaner

EDITOR-IN-CHIEF

How to make strong, ductile Hi-Steel *even stronger!*



Inland Hi-Steel has proved itself in applications where high strength and great workability are necessary. Not so widely known is the fact that the advantages coming from the inherent strength of Hi-Steel can be augmented by precipitation hardening, a simple and inexpensive heat treating process.

Through this heat treatment, the yield strength of Hi-Steel is readily increased 20,000 pounds per square inch, and its ultimate tensile strength 25,000 pounds per square inch, giving Hi-Steel a 250% advantage over structural grade carbon steel in yield strength, and about a 160% advantage in tensile strength. And this, while retaining remarkably high ductility and impact resistance.

Shown, are examples of results obtained by the precipitation hardening of a ¼ inch plate of Hi-Steel at 1000° and 1100° Fahrenheit for periods of 4 and 8 hours.

	1000° F.		1100° F.	
	4 hours	8 hours	4 hours	8 hours
Yield Point	84,000 psi.	80,000 psi.	75,000 psi.	72,000 psi.
Tensile Strength	94,000 psi.	88,000 psi.	82,000 psi.	79,000 psi.
Elong. in 2" (per cent)	30	30	32	34
Reduction in Area (per cent)	60	63	67	67
Charpy Impact at 75° F.	50 ft. lbs.	53 ft. lbs.	56 ft. lbs.	63 ft. lbs.
Charpy Impact at —50° F.	22 ft. lbs.	23 ft. lbs.	54 ft. lbs.	52 ft. lbs.

With these big boosts in its yield and tensile strength, Hi-Steel can be used to trim off still more weight in reducing the operating and maintenance costs of mobile equipment and in adding to payload. This economical high strength steel in its precipitation hardened state also becomes even better adapted for use in parts subject to stress and for withstanding abrasive wear.

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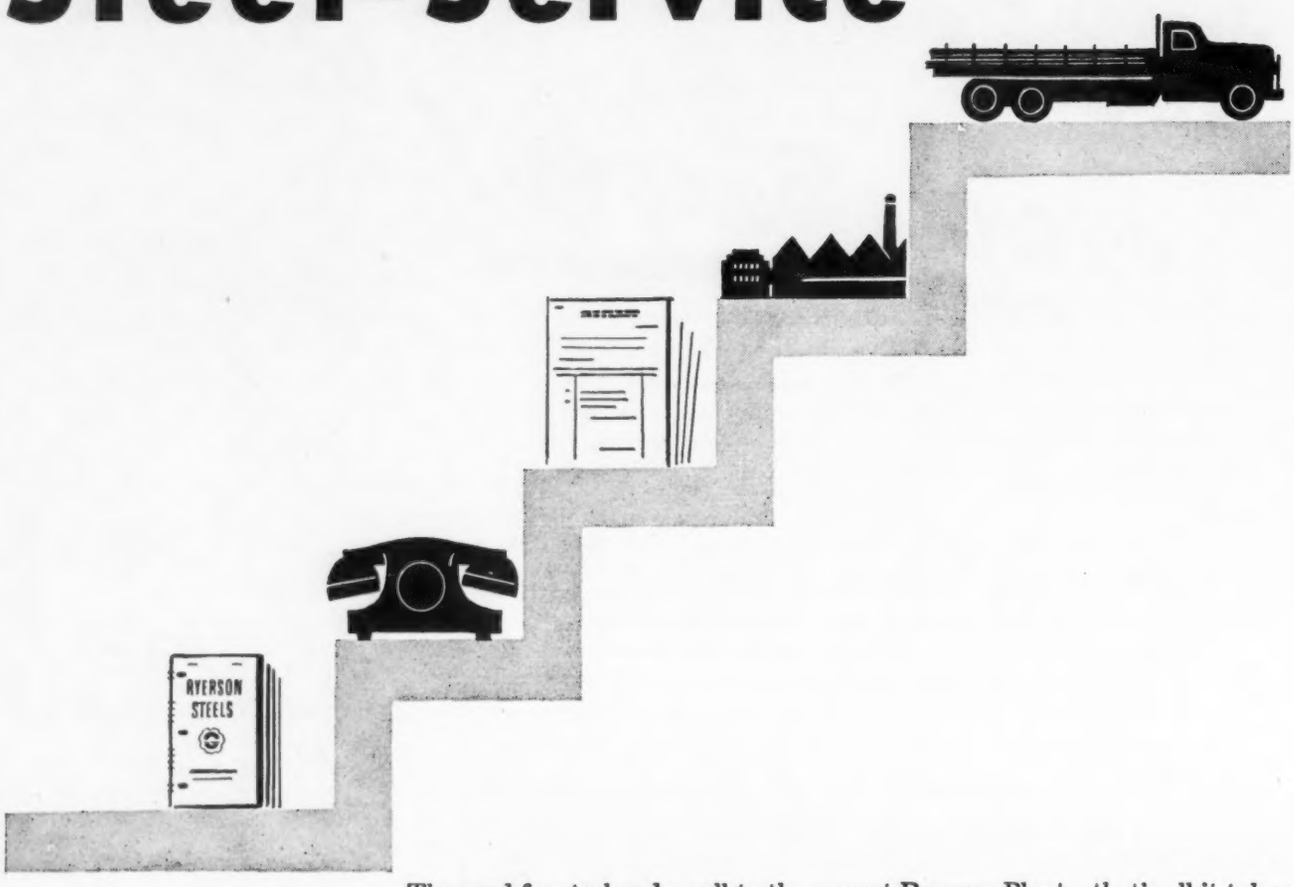

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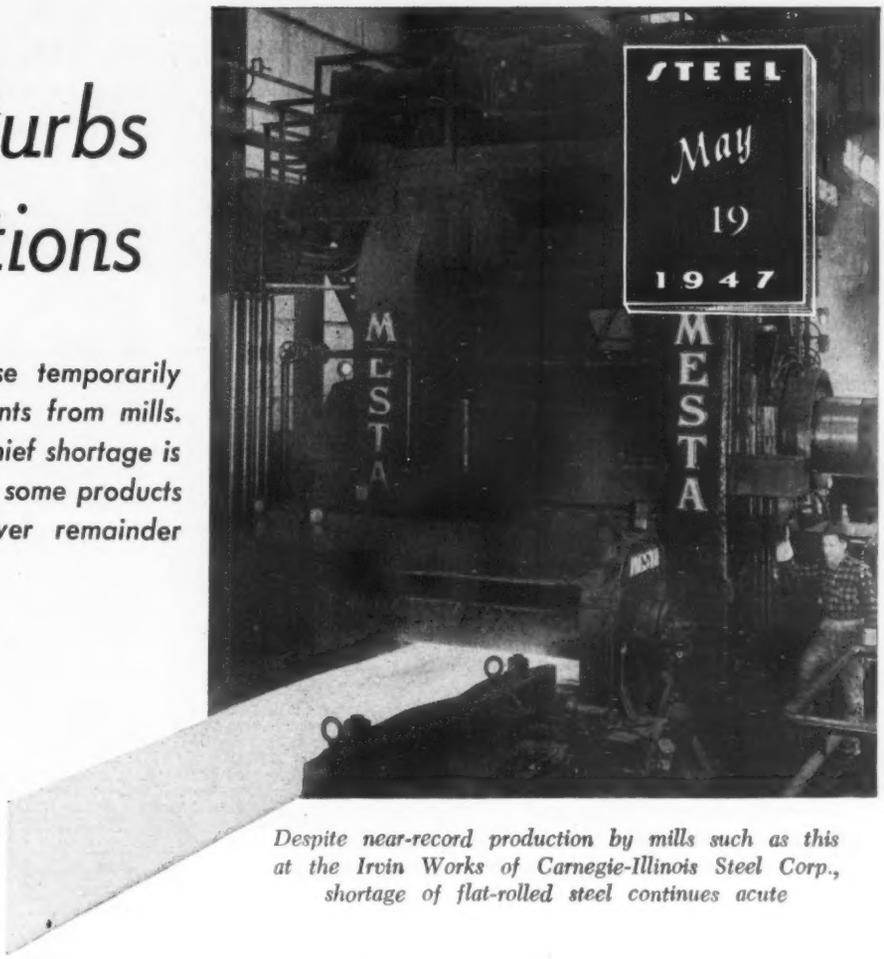
RYERSON STEEL

Steel Lack Curbs Shop Operations

Some metalworking plants close temporarily pending receipt of steel shipments from mills. Automotive industry hard hit. Chief shortage is in flat-rolled. Relief expected in some products but tight situation indicated over remainder of year



Despite near-record production by mills such as this at the Irvin Works of Carnegie-Illinois Steel Corp., shortage of flat-rolled steel continues acute

METALWORKING industries are chewing up steel at a faster pace than the mills can turn it out. Despite record-breaking peacetime production of steel, consuming industries are finding it impossible to build inventories sufficient to sustain capacity operations, and in a number of lines manufacturers have been forced to close down plants temporarily pending receipt of steel from the mills.

The automotive industry has been particularly hard hit, output of cars in the week ended May 17 being estimated at only 70,000 against 93,369 the week preceding and 101,690 the week prior to that (see Mirrors of Motordom, p. 69). However, metal stamping and other metalworking shops also are acutely pinched for steel, being unable to attain the rate of operations which current demand warrants and plant facilities would permit.

Scarcity is most acute in sheets and strip, but is also severe in plates, small bars and pipe. Here and there some easing in demand is noted with purchasers exercising somewhat more caution in ordering ahead, but for the most part the mills are booked far into the future and are carrying backlogs which assure virtual capacity operations well into 1948. Progressive easing in supply conditions are expected in some products as the year advances, the flat-rolled products being an outstanding exception in this respect. Alloy items have been fairly plentiful for some time past.

Steel is moving into consumption in the largest volume in many months. Shipments in March, last month for which detailed data are available, increased nearly 15 per cent over the February total, reaching a new high since May, 1945, according to the American Iron & Steel Institute. Shipments for the month totaled 5,304,415 net tons compared with 4,626,424 in February.

These figures represent net shipments and exclude those to members of the industry for conversion into further finished products or for resale. Conversion shipments amounted to 494,046 tons in March and 389,510 tons in February.

Total net shipments for the first quarter amounted to 14,996,543 net tons while shipments to members of the industry amounted to 1,358,107 tons.

Hot-rolled bars accounted for a slightly larger percentage of shipments in March, totaling 834,646 tons, or 15.7 per cent. Hot-rolled carbon bars accounted for 557,630 tons, or 10.5 per cent. Although the tonnage of cold-finished bars increased to 165,740 tons, the percentage of the total was slightly lower at 3.1.

In the sheet classification, hot-rolled accounted for 609,747 tons, 11.5 per cent; cold-rolled, 483,051, 9.1 per cent; galvanized, 136,300, 2.6 per cent; electrical and enameling, 45,741 tons, 0.9 per cent. Hot-rolled strip shipments totaled 144,268 tons, 2.7 per cent; cold-rolled strip, 132,403 tons, 2.5 per cent.

Shipments of pipes and tubes, accounting for 9.4 per cent of the total, were recorded in tons as follows: Butt weld, 129,002; seamless, 187,413; electric weld, 88,532; mechanical and pressure tubing, 55,599; lap weld, 31,603; conduit, 9910.

Wire rod shipments, accounting for 1 per cent of the total, amounted to 51,268 tons while shipments of wire products, accounting for 6.5 per cent of the total, were as follows in tons: Drawn wire, 206,546; nails and staples, 74,896; woven wire fence, 34,351; barbed and twisted wire, 18,258; bale ties, 10,551.

Electrolytic tin and terne plate shipments increased sharply in March to 134,470 tons from 92,704 in February, accounting for 2.5 and 2.0 per cent, respectively, while hot-dipped plate increased to 158,145 tons from 136,466 tons, accounting for 3.0 per cent of the total in both months.

Current high rate of operations in the manufacturing industries explains the unusually tight situation with respect to steel supply in the face of record peacetime production. For example, the latest Federal Reserve Board report (March) places the index of total industrial production at 189 against 168 a year ago with the durable goods manufactures index at 223 against 183 last year. The machinery index for March was at 278 against 207 in March, 1946, that for automobiles at 191 against 114.

Relief in current tight supply is confidently predicted in some products over the next few months. However, there is little prospect of any substantial change in conditions with respect to flat-rolled items. And this despite the fact flat-rolled shipments are substantially above the movement of such items a year ago and in the last prewar year. Sheet and strip shipments this year will total a

record 18 million tons in event the March rate of shipments is maintained over the remainder of the year. Projected shipments of sheets and strip this year, based on March tonnage, as compared with actual movement in 1946 and 1941, the last prewar year, are given in the following table:

COMPARATIVE FLAT-ROLLED STEEL SHIPMENTS

(Net Tons)

	1947*	1946	1941
Hot rolled sheets	7,039,213	5,521,463	7,466,687
Cold rolled sheets	5,640,884	4,075,554	3,024,960
Galvanized sheets	1,617,530	1,462,053	1,621,635
Electric & Enamel	545,833	435,170	742,001†
Hot rolled strip	1,724,241	1,363,812	2,013,436
Cold rolled strip	1,566,291	1,282,146	1,322,066
Total	18,134,042	14,140,198	16,190,785

* Estimated—based on rate of shipments during March. † Classified as All Other.

An interesting point developed by these data is that hot-rolled sheet shipments this year should top those in 1946 by 27 per cent but fall under the 1941 movement by about 6 per cent. Cold-rolled

(*Please turn to Page* 160)

STEEL INGOT PRODUCTION STATISTICS

Based on reports by companies which in 1946 made 97.6% of the open hearth, 100% of the bessemer and 85.8% of the electric ingot and steel for castings production

	Estimated Production—All Companies								Calculated weekly	
	—Open Hearth—		—Bessemer—		—Electric—		—Total—		produc-	Num-
1947	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	tion all companies Net tons	ber of weeks in mo
Jan.	6,544,841	95.1	384,096	87.7	*284,309	*65.9	*7,213,246	93.0	*1,628,272	4.43
Feb.	5,830,371	93.8	*314,912	79.6	276,779	71.1	*6,422,062	91.7	*1,605,515	4.00
*Mar.	6,614,369	96.1	378,893	86.5	314,224	72.9	7,307,486	94.3	1,649,545	4.43
*1st qtr.	18,989,581	95.0	1,077,901	84.8	875,312	69.9	20,942,794	93.1	1,628,522	12.86
†Apr.	6,361,987	95.4	375,744	88.6	311,036	74.5	7,048,767	93.9	1,643,069	4.43
1946										
Jan.	3,528,090	51.1	207,512	47.4	136,452	29.2	3,872,054	49.6	874,053	4.43
Feb.	1,300,944	20.9	25,905	6.6	65,668	15.6	1,392,517	19.8	348,129	4.00
March	5,946,698	86.2	363,949	83.1	196,400	42.0	6,507,047	83.3	1,468,859	4.43
1st qtr.	10,775,732	53.8	597,366	47.0	398,520	29.4	11,771,618	51.9	915,367	12.86
Apr.	5,333,139	79.8	286,088	67.5	241,031	53.3	5,860,258	77.5	1,366,028	4.29
May	3,699,979	53.6	153,409	35.0	219,064	46.9	4,072,452	52.2	919,289	4.43
June	5,145,594	77.0	251,233	59.2	227,979	50.4	5,624,826	74.4	1,311,148	4.29
2nd qtr.	14,178,712	69.9	690,750	53.7	688,074	50.1	15,557,536	67.9	1,195,814	13.01
1st 6 mos.	24,954,444	61.9	1,288,116	50.4	1,086,594	39.8	27,329,154	59.9	1,056,403	25.87
July	6,023,799	87.5	365,332	83.6	228,083	48.9	6,617,214	84.9	1,497,107	4.42
Aug.	6,287,617	91.1	373,837	85.4	261,755	56.0	6,923,209	88.7	1,562,801	4.43
Sept.	5,947,688	89.2	371,465	87.8	235,054	52.1	6,554,207	86.9	1,531,357	4.28
3rd qtr.	18,259,104	89.3	1,110,634	85.6	724,892	52.3	20,094,630	86.8	1,530,436	13.13
9 mos.	43,213,548	71.1	2,398,750	62.2	1,811,486	44.0	47,423,784	69.0	1,215,994	39.00
Oct.	6,308,845	91.4	387,933	88.6	253,562	54.3	6,950,340	89.0	1,568,926	4.43
Nov.	5,869,767	87.8	318,350	75.1	268,655	59.4	6,456,772	85.4	1,505,075	4.29
Dec.	5,283,651	76.7	222,704	51.0	253,353	54.3	5,759,708	73.9	1,303,101	4.42
4th qtr.	17,462,263	85.3	928,987	71.5	775,570	56.0	19,166,820	82.8	1,458,662	13.14
2nd 6 mos.	35,721,367	87.3	2,039,621	78.5	1,500,462	54.1	39,261,450	84.8	1,494,536	26.27
Total	60,675,811	74.7	3,327,737	64.6	2,587,056	47.0	66,590,604	72.5	1,277,150	52.14

† Preliminary. * Revised.

For 1947 percentages are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 bessemer, and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of Jan. 1, 1947, as follows: Open hearth 81,010,990 net tons, bessemer 5,154,000 net tons, electric 5,076,240 net tons, total 91,241,230 net tons.

For 1946, percentages are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of Jan. 1, 1946, as follows: Open hearth 81,236,250 net tons, bessemer 5,154,000 net tons, electric 5,500,290 net tons, total 91,890,540 net tons.

FINISHED STEEL SHIPMENTS IN MARCH AND YEAR TO DATE

Steel Products	Number of companies	Items	MARCH - 1947			To Date This Year			Whole Year 1946		
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	40	1	216,755	4.1	201,383	* 632,552	4.2	* 524,637	1,949,624	4.0	1,645,748
Structural shapes (heavy)	13	2	389,713	7.3	234	1,085,391	7.2	979	3,474,284	7.1	5,399
Steel piling	3	3	26,343	0.5	-	80,422	0.5	23	205,313	0.4	141
Plates (sheared and universal)	29	4	526,581	9.9	14,651	1,438,664	9.6	57,703	4,152,181	8.5	250,709
Skelp	5	5	18,610	0.4	31,778	44,741	0.3	94,721	227,033	0.5	194,666
Rails—Standard (over 60 lbs.)	4	6	166,795	3.2	-	555,376	3.7	155	1,790,311	3.7	4,890
—All other	5	7	14,573	0.3	-	43,202	0.3	24	144,999	0.3	426
Joint bars	7	8	17,409	0.3	1,419	47,677	0.3	3,401	176,803	0.4	5,327
Tie plates	8	9	41,644	0.8	719	114,483	0.8	2,094	447,496	0.9	18,700
Track spikes	8	10	16,144	0.3	21	43,641	0.3	31	146,194	0.3	693
Hot Rolled Bars—Carbon	33	11	557,630	10.5	64,885	*1,559,348	10.4	* 196,849	5,006,859	10.3	707,991
—Reinforcing—New billet	15	12	100,464	1.9	1,081	292,427	1.9	2,439	1,048,483	2.1	7,381
—Rerolled	11	13	13,696	0.2	-	32,376	0.2	-	141,346	0.3	1,267
—Alloy	26	14	162,856	3.1	20,762	447,184	3.0	* 55,967	1,390,278	2.8	138,395
—Total	44	15	834,646	15.7	86,728	*2,331,335	15.5	* 255,255	7,586,966	15.5	855,034
Cold Finished Bars—Carbon	29	16	143,006	2.7	480	* 405,215	2.7	1,409	1,316,579	2.7	2,428
—Alloy	25	17	22,734	0.4	119	* 67,368	0.5	368	196,237	0.4	1,725
—Total	35	18	165,740	3.1	599	* 472,583	3.2	1,777	1,512,816	3.1	4,153
Tool steel bars	19	19	8,448	0.2	434	* 24,350	0.2	* 1,180	96,020	0.2	371
Pipe & Tubes—Butt weld	15	20	129,002	2.4	5,359	377,160	2.5	15,146	1,276,289	2.6	45,393
—Lap weld	8	21	31,603	0.6	301	99,248	0.7	523	305,516	0.6	238
—Electric weld	11	22	88,532	1.7	1,126	* 222,940	1.5	2,968	674,459	1.4	591
—Seamless	11	23	187,413	3.5	15,531	512,395	3.4	38,139	1,871,540	3.8	83,441
—Conduit	6	24	9,910	0.2	896	29,398	0.2	2,140	98,521	0.2	2,448
—Mechanical and pressure tubing	12	25	55,599	1.0	1,796	156,650	1.0	4,554	429,180	0.9	3,478
Wire rods	21	26	51,268	1.0	16,237	* 147,881	1.0	50,944	679,998	1.4	346,506
Wire—Drawn	38	27	206,546	3.9	16,261	* 625,069	4.2	* 50,152	1,933,124	4.0	135,592
—Nails and staples	18	28	74,896	1.4	451	* 220,058	1.5	* 1,394	636,632	1.3	797
—Barbed and twisted	14	29	18,258	0.3	8	56,333	0.4	8	207,610	0.4	-
—Woven wire fence	13	30	34,351	0.7	261	99,645	0.7	927	383,230	0.8	-
—Bale ties	12	31	10,551	0.2	-	* 30,014	0.2	* -	99,993	0.2	-
Black Plate—Ordinary	9	32	74,057	1.4	235	216,696	1.4	848	781,167	1.6	3,179
—Chemically treated	8	33	2,334	-	-	11,725	0.1	-	125,170	0.3	-
Tin and Terne Plate—Hot dipped	9	34	158,145	3.0	222	453,693	3.0	222	1,924,657	3.9	-
—Electrolytic	9	35	134,470	2.5	529	316,257	2.1	529	909,173	1.9	-
Sheets—Hot rolled	30	36	609,747	11.5	60,591	*1,752,209	11.7	152,976	5,521,463	11.3	421,198
—Cold rolled	17	37	483,051	9.1	3,330	1,293,425	8.6	5,597	4,075,554	8.4	3,397
—Galvanized	16	38	136,300	2.6	20	390,830	2.6	64	1,462,053	3.0	1,725
—Electrical and enameling	10	39	45,741	0.9	58	134,214	0.9	305	435,170	0.9	-
Strip—Hot rolled	23	40	144,268	2.7	30,121	425,829	2.8	80,502	1,363,812	2.8	237,176
—Cold rolled	33	41	132,403	2.5	2,747	374,664	2.5	8,136	1,282,146	2.6	25,904
Wheels (car, rolled steel)	5	42	28,373	0.5	-	92,558	0.6	-	252,308	0.5	348
Axles	5	43	14,196	0.3	-	43,235	0.3	53	130,461	0.3	221
All other	-	44	-	-	-	-	-	-	6,266	-	-
TOTAL STEEL PRODUCTS	141	45	5,304,415	100.0	494,046	*14,996,543	100.0	*1,358,107	48,775,532	100.0	4,297,889

* Adjusted.

Labor Reform Bill Shaped by Senate and House Conferees

Senate passes measure by more than two-thirds majority necessary to override presidential veto. Industry-wide bargaining ban provision of House bill likely to be dropped in conference to hold doubtful Senate votes

SENATE and House conferees are ironing out the differences in labor reform bills this week and passage of a compromise bill is expected within the next few weeks.

The Senate approved its labor bill last week by a vote of 68 to 24, more than the two-thirds majority needed to override a presidential veto. The House earlier had approved a more drastic labor reform bill by a vote of 308 to 107, and overriding of probable executive veto by the House is considered certain.

The Senate bill omitted a ban on industry-wide bargaining which is one of the strong features of the House measure. House leaders indicated they may drop this feature during the conferences; it is believed its inclusion in the conference bill would cause enough senators to switch their position to make overriding of a presidential veto unlikely.

The House bill bans mass picketing, violence and makes the unions subject to the antitrust laws for such concerted activities. It also outlaws "unreasonable" union fees, forbids unions making contributions in national elections and primaries, and seeks to prevent sitdowns and featherbedding practices.

Both Senate and House bills contain the following provisions:

Outlaw closed shop, but permit the union shop.

Prohibit jurisdictional strikes and secondary boycotts.

Authorize the government to obtain injunctions to block national emergency strikes, such as a coal or steel tieup.

Create a new federal mediation agency, independent of the Labor Department.

Make unions liable for unfair labor practices.

Require unions to register and issue financial reports.

Grant employers freedom of speech on labor issues.

Outlaw union coercion in organizing campaigns.

Free employers of obligation to bargain with supervisory workers.

Make unions subject to suit for violation of contract.

Michigan Votes Labor Curbs

Michigan state senate last week passed two labor reform bills and the lower house approved another.

The senate passed a bill outlawing communism in labor unions and requiring foreign agents to register. The second bill passed bans picketing of residences and provides compulsory arbitration of labor disputes at hospitals, public utilities and municipal services.

The house bill outlaws strikes by public employees, with penalties including dismissal, loss of seniority and retirement rights, and provides jail sentences for outsiders urging such strikes.

Steel Ingot Production Declines During April

Steel production during the first four months of 1947 was more than 10 million tons higher than output in the like 1946 period, according to the American Iron & Steel Institute, New York. Totals for the respective periods were 27,991,561 and 17,631,876 net tons.

Production of steel ingots and steel for castings declined moderately in April to 7,048,767 net tons from the March peacetime monthly record of 7,307,486 net tons. Average weekly production in April was 1,643,069 net tons, a decline of less than 6500 net tons from the 1,649,545 net ton rate for March.

Average operating rate during April was 93.9 per cent of capacity compared with 94.3 per cent during March and 77.5 per cent during April, 1946. Open-hearth furnace operations showed a slight decline in April due to natural gas shortages in some places, and the average rate for these furnaces during the month was 95.4 per cent of capacity, a small dip from the March average of 96.1 per cent.

Present, Past and Pending

■ WEIRTON STARTS MILE-A-MINUTE COLD STRIP MILL

WEIRTON, W. VA.—Weirton Steel Co. has started its new No. 6 cold strip mill, capable of rolling strip steel at a rate of a mile a minute. Output will consist mainly of tin plate gages, ranging from 6/1000 to 15/1000-in. in thickness and will increase Weirton's output of tin mill products by 50 per cent. Mill also may be used to roll strip up to 25 gage.

■ MIDVALE OFFICERS MOVE UP

PHILADLPHIA—Francis P. Bradley, formerly president, has been elected chairman, the Midvale Co., Nicetown, and R. T. Nalle, formerly executive vice president, has been named president.

■ REYNOLDS TO CLOSE LONGVIEW PLANT FOR YEAR

RICHMOND, VA.—Reynolds Metals Co. will close its aluminum plant at Longview, Wash., for "approximately a year." During this time comprehensive improvement will be made in equipment.

■ TO BUILD BESSEMER PLANT AT LORAIN, O.

NEW CASTLE, PA.—Pennsylvania Engineering Corp. has been awarded a contract by National Tube Co., United States Steel Corp. subsidiary, to build a new bessemer plant for the Lorain Works at Lorain, O. Contract calls for fabrication and installation of four 25-ton bessemer converters, two 800-ton hot metal mixers, blast piping, transfer cars and auxiliary equipment.

■ P & W NEGOTIATES FOR ROLLS-ROYCE ENGINE

EAST HARTFORD, CONN.—Pratt & Whitney Aircraft Division of United Aircraft Corp. is negotiating for American manufacturing and sales rights to the Rolls-Royce Nene Turbo engine. Preparations are underway to begin tooling up for production of the engine.

■ STEEL FIRMS ASKED TO TESTIFY ON MONOPOLY BILL

WASHINGTON—Four steel companies, U. S. Steel, Bethlehem, Inland and Jones & Laughlin, have been invited to testify on the pending Kefauver-O'Mahoney antimonopoly bill before the Senate Judiciary subcommittee.

■ NEW BUSINESS INCORPORATIONS DECLINE

NEW YORK—New stock incorporations for the first quarter of 1947 were 12 per cent below the number for corresponding 1946 period, according to Dun & Bradstreet.

Mill Supply Men Warned To Gear Activities to Buyers' Market

Rising and unbalanced inventories beginning to reflect change in buying pattern, manufacturers and distributors told at Atlantic City convention. Close scrutiny of selling prices urged. Severe economic setback thought unlikely

IN Atlantic City last week, 1310 manufacturers and distributors of mill supplies were warned that it is necessary to gear up their activities for the buyers' market now close at hand. This already is reflected in mounting but unbalanced inventories.

Return to a buyers' market will require close scrutiny of selling prices of goods but it was admitted that reductions will be difficult in face of rising labor and other costs.

As for business, it was generally felt that there will be no general economic setback nor will there be a deep depression in the next four or five years.

Walter W. Kemphert, manager, Merchandising Division, Worthington Pump & Machinery Corp., Harrison, N. J., said that keen competition in the buyers' market will demand dynamic sales management to get the fullest co-operation, the greatest efforts, and the maximum results from manpower.

Suggests Sales Program Be Analyzed

Pointing to sales as a major contribution to a prosperous national economy, Mr. Kemphert asked six basic questions of manufacturers of mill supplies:

1. Do you have the right type of men in your sales work?
2. Are they properly trained for the job to be done?
3. Do they understand our method of distribution?
4. Are they directed properly for top efficiency?
5. Are they sparked through proper incentive to give their best?
6. Are they supported with the necessary tools to do effective sales work?

"If the answers to these questions are affirmative," Mr. Kemphert said, "we will be well on the way toward avoiding any major recession."

William W. French, director of sales promotion, Dodge Mfg. Corp., Mishawaka, Ind., recommended greater advertising schedules to adequately and economically reach as many buying factors as resources will permit. Referring to the American Supply & Machinery Manufacturers' Association's booklet, "Better Sales Promotion for Industrial Distribution," Mr. French pointed to the need for better packaging, better labeling, better displays, and uniformity of size, punching, margins, weight, and arrangement of catalog sheets supplied to distributors.

National sales of 114 manufacturers of mill supplies indicate that there has been further decentralization of manufacturing activities during the war years.

However, in reporting on the new survey, Burt E. Hotvedt, sales promotion manager, Blackhawk Mfg. Co., Milwaukee, said that "Contrary to some general beliefs, temporary wartime business did not reflect a sharp upturn in the relative postwar importance of the Pacific Coast. The Pacific states accounted for 11.16 per cent of the national volume in 1940 and 11.29 per cent in 1946, according to the survey; although Oregon climbed from 1.29 per cent in 1940, up to 1.62 per cent for 1946."

Among the states showing the greatest increases are Missouri, North Carolina, Texas, Minnesota and Tennessee. Of the major cities, striking advances have been recorded for St. Louis, Minneapolis, Louisville and Kansas City.

Robert R. Wason, chairman of the board, National Association of Manufacturers, and president, Manning Maxwell & Moore Inc., New York, stated the manufacturer and distributor are at the mercy of wages when determining prices, because wages make up from two-thirds to four-fifths of the ultimate price paid by the consumer, the difference in the fractions depending on the product.

"Th increased efficiencies and savings of industry achieved in recent years," he said, "have been siphoned off to labor in wages by government's intervention. This has prevented the reduction in prices of your goods to consumers."

Dexter M. Keezer, director, Department of Economics, McGraw-Hill Publishing Co., New York, said that in spite of several soft spots which have recently showed up in our economy, we are not in for a general economic setback, nor will it move on into a deep depression.

"A good many people," he said, "were afflicted by the economic jitters contracted during the 30s; but if they look at the basic economic facts, rather than what they fear might be under the bed, if they dared to look, they will see no basis for fearing a general economic setback in the near future."

W. H. GEBHART

Newly elected president, American Supply & Machinery Manufacturers' Association

Pointing to the "soft spots" in department store trade, radio manufacturing, some lines of woolens, jewelry and fur trades, night club and transport businesses and a few more, Mr. Keezer stated that this slowing up of economic activity has been following a pattern which, on some previous occasions, has wound up in a general and deep depression. Consequently, it brings up two very engaging questions:

1. Are we now in for a *general* economic setback?
2. Will it move on into a deep depression?

"So far as I can tell, the right answer to both of these questions is 'no.' I think there will be more troubles, and I would not be surprised to see these troubles result in the temporary unemployment of several million around the end of the year; but at the same time these troubles I have mentioned are being worked off, other parts of our economy, primarily those engaged in producing durable goods, will be going full steam ahead, and will continue to do so for many months."

The steel pipe situation will continue tight for some time, according to Henry Wallace, general manager of sales, National Tube Co., Pittsburgh. National

now is taking orders for larger diameter pipe for delivery in the first half of 1951 and other companies are in about the same position.

As far as merchant pipe is concerned, production is considerably higher but still it has been impossible to keep pace with demand. During 1937-40, steel ingot production averaged about 52 million tons annually, of which 10 per cent went into pipe. The same percentage will apply against 1947 record peacetime ingot production.

Production of steel tubular products in 1939 was 3,750,000 tons and rose to 4,700,000 tons in 1946 despite work stoppages, etc. About 6 million tons will be produced this year, of which around 40 per cent will be standard pipe.

Mr. Wallace said that the new continuous, seamless tube mill projected for the Lorain, O., plant will be three times as fast as existing equipment.

H. K. Clark, president, Carborundum Co., Niagara Falls, N. Y., said his company has placed in effect a new quantity-price program designed to reduce losses on small orders.

Pricing has been a difficult problem in the abrasive field since over 300,000 size and grade specifications ordinarily are manufactured and, on the average, 40 per cent of the orders placed account for only 2 per cent of total volume. These small orders show no profit.

Theodore F. Smith, president, Oliver Iron & Steel Corp., Pittsburgh, emphasized the constant necessity of striving to reduce costs by better manufacturing.

Mr. Smith said that the manufacturers and distributors, working jointly, have gone a long way in bringing about better distribution at lower costs by better selling of better products. However, there are certain necessities which must be recognized to attain this goal:

1. Necessity of constantly fighting wasteful expenditures on part of government and the uneconomic demands brought about by pressure from union leaders.

2. Necessity of constantly reminding the public and employees that only by increased productivity are wages raised and costs lowered.

3. Necessity of educating the public that government and labor must contribute as well as manufacturers in overall reduction of prices.

The American Supply & Machinery Manufacturers' Association elected the following officers: President, W. H. Gebhart, Henry Disston & Sons Inc., Philadelphia; first vice president, J. C. Geddes, H. K. Porter Inc., Somerville, Mass.; second vice president, W. W. Kemphert, Worthington Pump & Machinery Corp., Harrison, N. J.; and treasurer, G. H. Boucher, Pyrene Mfg. Co., Newark, N. J.

John G. Seiler, Tube Turns Inc., Louisville, Ky., and K. R. Beardslee, Carboloy Co., Inc., Detroit, were named members of the executive committee for the term expiring 1950. Howard A. Vaughan, Vaughan & Bushnell Mfg. Co., Chicago, and Frank P. Green, Delta File Works Inc., Philadelphia, will fill the unexpired 1-year terms of Mr. Geddes and Mr. Kemphert.

Officers elected by the National Supply & Machinery Distributors' Association were: President, F. Marsena Butts, Butts & Ordway Co., Cambridge, Mass.; vice president, areas 1 and 2, Ray C. Neal, R. C. Neal Co., Buffalo; vice president, areas 3 and 4, Edward K. Welles, Charles H. Besly & Co., Chicago; vice president, areas 5 and 6, W. A. Haseltine, J. E. Haseltine & Co., Portland, Oreg.

Executive committee members are: Area No. 1, H. D. Holden, Silliter-Holden Inc., Hartford, Conn.; area No. 2, H. E. Torell, Syracuse Supply Co., Syracuse, N. Y.; area No. 3, Charles T. Bush, Charles A. Strelinger Co., Detroit; area No. 4, J. H. Ruddell, Central Rubber & Supply Co., Indianapolis; area No. 5, H. P. Lambrecht, Salt Lake Hardware Co., Salt Lake City; and area No. 6, A. W. Lohn, Ducommun Metals & Supply Co., Los Angeles.

New officers elected by the Southern Supply & Machinery Distributors' Association are: President, T. J. Kenny, S. B. Hubbard Co., Jacksonville, Fla.; first vice president, Richard Alcott, Riechman-Crosby Co., Memphis, Tenn.; and second vice president, George G. Weaks, Weaks Supply Co., Monroe, La.

J. C. GEDDES

W. W. KEMPHERT

JOHN G. SEILER

K. R. BEARDSLEE

G. H. BOUCHER

Warehousemen Discuss Problems

Necessity for telling industry story to the public emphasized as means of protecting American free enterprise system

Distributors told steel supply soon to approach balance with demand. Need rational marketing procedure

LOS ANGELES

SEVERAL hundred members and guests from the East traveling on the Santa Fe Super Chief, Chief, and Grand Canyon Limited joined their contemporaries from the Pacific states to form an attendance of more than 500 at the 38th annual meeting of the American Steel Warehouse Association at the Biltmore Hotel here May 12 to 15.

In three compact sessions, the warehousemen listened to a program in which the importance of public relations, labor relations and interindustry relations was emphasized strongly.

At the first general session with E. Jungquist, Percival Steel & Supply Co., Los Angeles, presiding, visitors to the convention were greeted by Harrison Fuller, president, Bethlehem Pacific Coast Steel Corp.; A. B. Ordway, vice president and general manager, Iron & Steel Division, Kaiser Co. Inc., and Norman W. Foy, general manager of sales, Republic Steel Corp.

More Data To Be Disseminated

Walter S. Doxsey, president of the ASWA, reporting on the "State of the Association," announced that certain activities suspended during the emergency period when Washington was the control center will be revived and expanded. Included will be a broadening of the statistical service on volume of warehouse business and, if possible, on warehouse operating costs.

Mr. Doxsey announced that the direction and leadership of the association would be changed by the election of a chairman of the executive committee from the industry. This chairman will preside at the meetings of the executive committee and will counsel and advise the president on matters of general policy.

Turning to economic problems confronting the distributors, Mr. Doxsey pointed out that all the basic factors upon which warehouse prices are predicated have been sharply increased since the war.

"Labor costs have more than doubled. Cutting costs are outrunning revenues received. Delivery charges show similar advances. Overhead costs have jumped right along with the others. Mill base prices have increased.

"Of even greater importance, additions of new mill extras and the pyramiding of old ones have imposed severe strains upon long established principles of warehouse pricing. In the first place, with few moderate exceptions, warehouse spreads in dollars per ton remain about the same as they were before the war and in the 1930s. The cost of steel has jumped considerably through these base price increases and increases in extras; hence the percentage profit enjoyed by the warehouse has been reduced. Secondly, some of the new extras cannot very well be passed along to the customers, as was generally done in the past. And still others must be paid and absorbed on some items and not on others and by some warehouses and not by others."

WALTER S. DOXSEY
Re-elected president, American Steel Warehouse Association

That distributors have been able to cope with these problems and make a fair profit is in large measure due to present rapid turnover, an increased participation in steel distribution and to that fact that the average size of orders today is much larger than ever before.

"Without these larger volumes, rapid turnovers and bigger individual orders you probably would be bankrupt," Mr. Doxsey told his audience.

"You are confronted, therefore, with the intricate task of adjusting your business to vastly increased labor costs, and perplexing changes in mill prices and extras, and at the same time, of anticipating impacts upon your business of lower volume, smaller turnover and, very likely, a decrease in the average size of your orders. From the stratosphere of a sellers' market you must cast your eyes downward and envision pricing procedures that will give you security and stability in a buyers' market."

Mr. Doxsey advised increased mechanization to offset increased labor costs, attempt to keep large order business, encouraging of smaller consumers to concentrate their requirements with one, not several, warehouses, cultivation of the consumer on the fringe between a warehouse and mill buyer and closer attention to the policy of handling small orders.

William B. Seymour Jr., assistant vice president, Joseph T. Ryerson & Son Inc., discussed labor relations in the steel warehouse industry. He presented numerous case histories of recent labor controversies which indicated that under intelligent direction it is possible to negotiate reasonably satisfactory contracts with unions. His recommendations based upon these case studies, coupled with his answers at a later session to questions from members, constituted an unusually realistic short course in labor relations technique.

In an address entitled, "Our Side of the Story," Reese H. Taylor, president, Union Oil Co., outlined the motives which prompted his company to undertake its campaign of explaining to the people how and why American business functions. He said that in spite of the remarkable record made by American industry during the war a lot of people in Washington spent much of their time selling the idea that free enterprise was the bunk and the state should take things over. Also, surveys of public opinion have shown that the average American has many misconceptions about business. He thinks that 10 cents on the sales dollar would be a fair profit for a company and that most companies make profits greater than that. Actually the 1927 to 1943 average profit for all industry was 2.9 cents on the dollar.

Mr. Taylor said that to be of value to the people any product must meet four fundamental requirements. It must be useful, available in quantity, low enough in cost to be within reach of the mass of the people and of highest possible quality.

Growth in the consumption of oil, steel, automobiles and numerous other products of American industry indicate these four fundamentals are being met. Also, these products can be purchased by our people under the free enterprise system by fewer hours work than is the case under any other system. Mr. Taylor expressed confidence that the American people will rise to the defense of the American system if they understand clearly how it works and what it means.

At the second general meeting, with

Frank Pidgeon, Pidgeon-Thomas Iron Co., presiding, William M. Jeffers, vice chairman, Union Pacific Railroad, spoke on "Labor Relations—Where Do We Go?" He lamented the prevailing attitude, particularly among young people, of seeking security instead of opportunity. He declared it is the duty of businessmen to spend more time "selling" the American system to the coming generation.

L. B. Worthington, United States Steel Supply Co., presided at the third general session, which was addressed by Earl L. Shaner, editor-in-chief of STEEL and president of the Penton Publishing Co.

Exploring the pattern likely to be taken by the postwar iron and steel industry, Mr. Shaner examined three important aspects: (1) Ability of the industry to produce; (2) marketing and distribution; (3) the market itself.

"On the basis of past records of performance there should be little, if any, doubt about the ability of the industry to produce steel in the quantity, kind and quality necessary to meet reasonable requirements. . .

"However, the current persistent scarcity of steel, coupled with many uncertainties regarding domestic and world developments during the next few years, has caused some people to fear that we will not have enough steel capacity. . .

Incentive for Expansion Present

"While there is general agreement that a world-wide scarcity of steel may ensue for some time, American producers realize full well the grave dangers involved in over-expansion as well as they appreciate the criticism that would be heaped upon them if they were to underexpand. Naturally the present excess of demand over supply is a strong incentive for substantial expansion, but the sad memory that the industry operated at only 19.5 per cent of capacity in 1932 is a potent argument for caution.

"It must be remembered that the present steel ingot capacity of over 91 million tons already is substantially higher than the highest prewar capacity and that the current demand for steel is abnormal. Even so, it is quite clear that if present operations at over 90 per cent of capacity can continue uninterruptedly for a few more months, supply and demand will be approaching balance on all but a few steel products."

Marketing and distribution of steel, said Mr. Shaner, are attended by certain complications that are not encountered in its production. Production processes are relatively free of interference by government authority, whereas numerous operations in marketing and distribution are subject to many laws and regulations, some of which are interpreted in different ways at different times.

From the time the steel market was demoralized in the depression of the early 1930's there has been no rational system of marketing steel, the editor declared. The depression, NIRA, abandonment of Pittsburgh plus at the instigation of the government, the wartime emergency and the confusion of reconversion all combined to keep selling, pricing and distribution of steel in a state of abnormality.

"Only now are we beginning to see the first faint glimmering of an opportunity to evolve a normal marketing procedure. . .

"We should not take some of the cockeyed practices that prevail today too seriously. They are makeshift expedients, hurriedly adopted in a sellers' market to fill the void caused by the absence of normal market conditions for a period of 16 years. Certainly the obvious thing to do now is to evolve an intelligent marketing setup that will meet postwar conditions."

Mr. Shaner pointed out that the abandonment of Pittsburgh plus and the change to a multiple basing point system has not yet been tested in a normal market.

Another phase of marketing receiving attention is the charge for extras. Regardless of what one thinks of present extra charges, the speaker said, they do provide an automatic check upon the real needs of customers. The shaking-down process of revising extras may be expected to continue.

A third aspect stressed by Mr. Shaner is the narrowing of the sources of supply as result of mergers, largely the result of faulty political or economic conditions. He saw two dangers inherent in this trend. One is the creation of an economy of industrial giants that will result in greater government regulation and the second is the fading of the open market.

Warehouses, Mr. Shaner pointed out, have fared well during recent years. "Checking the figures of finished steel distributed through warehouses, I find that in the 20 years ended last Dec. 31 your companies handled 100,712,381 tons of steel. Dividing this 20-year period into four 5-year periods, the volume distributed from 1927 through 1931 was 17,973,627 tons; from 1932 through 1936 it was 14,437,379 tons; from 1937 through 1941, 29,482,514 tons; and during the past five years, 38,818,861 tons. On any basis of figuring, the warehouse industry has improved its position tremendously during this 20-year period."

Vast Potential Market for Steel

The size of the market for steel, concluded Mr. Shaner, will depend on the number of people that can afford to buy articles manufactured of steel. At present these people are concentrated in the United States, Canada, a few South American countries, Great Britain and her dominions and a few countries in Europe —representing about one-tenth of the world's populations. Even the United States market is far from saturated. If the submerged third of American families can be lifted to a higher standard of living, the market for steel will be increased to fantastic figures.

"Beyond that, in the decades to come is the opportunity that will be presented when the other nine-tenths of the world's peoples begin to lift their standards."

Dr. Park J. Ewart, University of Southern California, discussed credit terms in the steel warehouse industry.

A number of West Coast plants were visited, including the Fontana Steel Mill of Kaiser Co. and the Los Angeles warehouses of A. M. Castle & Co., Ducommun Metals & Supply Co., Earle M. Jorgensen Co., Percival Steel & Supply Co. and Joseph T. Ryerson & Son Inc. At one session, slides of new warehouses and warehouse improvements were shown.

OFFICERS OF ASWA

Walter S. Doxsey was re-elected president of the American Steel Warehouse Association at the annual meeting of the board of directors preceding the 38th annual convention.

A. W. Herron Jr., Jones & Laughlin Steel Corp., Pittsburgh, and J. J. Hill Jr., Hill-Chase & Co., Philadelphia, were elected vice presidents. F. C. Flosi, A. M. Castle & Co., Chicago, was named treasurer.

These four officers and the following are members of the executive committee for the coming year: Lester Brion, Peter A. Frasse & Co. Inc., New York; H. V. Douglas, Central Steel & Wire Co., Chicago; P. O. Grammer, Grammer, Dempsey & Hudson Inc., Newark, N. J.; E. D. Graff, Joseph T. Ryerson & Son Inc., Chicago; Earle M. Jorgensen, E. M. Jorgensen Co., Los Angeles; F. H. Lovejoy, Wheelock, Lovejoy & Co. Inc., Cambridge, Mass.; Frank Pidgeon, Pidgeon-Thomas Iron Co., Memphis, Tenn.; George L. Stewart, Edgar T. Ward's Sons Co., Pittsburgh; and L. B. Worthington, United States Steel Supply Co., Chicago.

Diesel Engine Production To Set New Peacetime Record in 1947

Ships, railroads turn increasingly to diesel-powered units, engine manufacturers' association director says. San Francisco, with five builders, and producing bulk of units made west of Mississippi, to benefit by trend

DIESEL engine production in 1947 will set a new peacetime record.

That is the prediction of Harvey T. Hill, executive director, Diesel Engine Manufacturers Association, in San Francisco to attend the National Maritime Exposition.

Mr. Hill bases his forecast on the swing of transportation to diesel engines as motive power. For example, he pointed out that "all types of ships and boats in the United States are turning today to diesel power with the exception of ocean-going vessels. Although only 5 per cent of such craft are being powered by diesels in America—compared with an average of 80 per cent in Norway, Sweden and England — the swing to diesels will occur here just as it has in Europe," he said.

On the Pacific Coast, Mr. Hill said, Jan. 1, 1947, statistics showed there were 1487 diesel-propelled fishing boats, 651 towboats and 269 freighters.

Another encouraging development for diesel engine manufacturers is the trend of railroads toward use of diesels.

"Last year," said Mr. Hill, "over 90 per cent of all locomotives purchased by this country's railroads were diesels, and this year the percentage will be closer to 100 per cent."

He pointed out that earlier this month New York Central Railroad announced it had bought 70 diesel locomotives at a cost of $12 million. Last year New York Central's diesel-powered locomotive purchases totaled 66. This trend, according to Mr. Hill, is especially significant, since in the past the Central was almost exclusively powered by steam.

The rising fortunes of diesel engine manufacturers is especially favorable for the San Francisco area. Diesel plants here produce more diesel engines than in all the rest of the nation west of the Mississippi river.

San Francisco region diesel producers are: Atlas Imperial Diesel Engine Co., Enterprise Engine & Foundry Co., Joshua Hendy Iron Works, Lorimer Diesel Engine Co. and Union Diesel Engine Co.

Westinghouse To Expand West Coast Operations

Westinghouse Electric Corp. has scheduled $30 million of production for 1948 and $40 million for 1949 at its new Sunnyvale, Calif., plant, acquired six weeks ago under long-term lease from Joshua Hendy Iron Works, according to Charles A. Dostal, vice president of Pacific Coast sales for the company.

Orders have been placed for machinery and tools to permit the company to begin early production of a wide variety of electrical and steam equipment at the Sunnyvale plant.

"Probably the first new products to emerge from the plant," Mr. Dostal reported, "will be distribution transformers and power transformers up to 5000 kva in size. Production of distribution transformers is expected to begin some time in July."

West To Produce Greater Proportion of Steel Needs

Although western production of steel must increase greatly before it can match output of plants in the eastern part of the nation, continued expansion of steel plant facilities will provide the West Coast with a greater proportion of its needs in coming years.

That is the view expressed by W. J. McClung, vice president, Bethlehem Pacific Coast Steel Corp., in a recent address before the Manufacturers Association of South San Francisco.

Mr. McClung said that although steelmaking facilities in the western states have been tripled since 1940, production in the Far West still is only 5 per cent of the nation's total.

GOVERNORS MEET: Western state governors and their representatives met recently in Seattle to discuss reductions in federal reclamation funds. Left to right, front row: Gov. L. C. Hunt, Wyoming; Gov. H. M. Maw, Utah; Gov. M. C. Wallgren, Washington; Gov. S. D. Ford, Montana; Gov. Earl Snell, Oregon. Back row: Gov. W. L. Knous, Colorado; Gov. Earl Warren, California; Alfred M. Smith, representing Gov. Vail Pittman, Nevada; C. A. Carson, representing Gov. Sidney Osborn, Arizona; Gov. C. A. Robbins, Idaho, and Robert Quinn of Nevada

Supreme Court Upholds Freight Rate Equalization

ICC's action to raise "class" rates in North and lower them in all but the Far West held to be legal

THE INTERSTATE Commerce Commission is now free to put into force new "class" freight rates designed to end sectional inequalities.

After the new rates were held up some months by litigation, the U. S. Supreme Court last week by a 7 to 2 decision upheld the ICC's action in ordering the new rates.

The ICC order does not apply to all freight, but only to "class" rates, which are charged by the railroads for hauling most manufactured goods. Raw commodities, such as steel, lumber and grain, do not come under class rates, but commodity rates. However, after these commodities have been transformed into tools, machinery, furniture and packaged foods they are charged class rates. The changes ordered by the ICC will affect about 20,000 manufactured articles.

The ICC order stipulates that northern railroads are to raise their class rates 10 per cent and that all other railroads, except those in the Far West, are to cut their class rates 10 per cent.

The law says freight rates must be just and reasonable, and the ICC found this could not be brought about until freight rates were the same all over the country. To accomplish this would take time, so as a stopgap measure the ICC ordered the 10 per cent boost for Official Territory (states east of the Mississippi and north of the Ohio and Potomac rivers) and 10 per cent cuts for all other territories except Mountain Pacific Territory.

The new rates were ordered in force on Jan. 1, 1946, but they were held up by a suit on the part of more than a dozen states. The ICC was upheld by three federal judges in the New York District Court, later by the United States Court of Appeals, and now by the U. S. Supreme Court.

The rate changes will go into effect, subject to the general increase that has been ordered in the meantime.

Safety, Production Feature Mining Congress Meeting

Faulty electrical equipment was held to be the cause of the largest percentage of mine fires by E. F. Maurer, general superintendent, Rail & River Coal Co., Bellaire, O., speaking at the opening session of the convention of the American Mining Congress in Public Hall, Cleveland, last week.

Mr. Maurer said that better installation and maintenance of this equipment will prevent and minimize coal mine fires.

Mechanization in the mines "has contributed greatly both to coal production and to accident reduction," C. G. Brehm, supervisor of safety and compensation, Susquehanna Collieries Co., Nanticoke, Pa., told delegates. Despite the decrease in accidents from falling materials as a result of mechanization, this new equipment, however, has added new hazards in the way of fires and explosions, he said.

P. M. Cassidy, safety inspector, Sloss-Sheffield Steel & Iron Co., Birmingham, another speaker who stressed mine safety during the meeting which lasted from May 12 through May 15, spoke on methods of transporting miners safely from the working face to the mine entrance.

Speaking on research programs to promote greater coal production, Charles J. Potter, assistant to the president, Rochester & Pittsburgh Coal Co., Indiana, Pa., said: "We have done nothing to change the centuries-old cycle of operations at the face."

Held in connection with the convention was an exposition of machinery and equipment for use in coal production. More than 175 exhibitors displayed the newest mining devices to more than 5000 delegates representing the United States and seven foreign countries.

Convention of Purchasing Agents To Be Held June 2-4

"How Much? . . . When? . . . For How Much?" will be the theme of the 1947 convention of the National Association of Purchasing Agents at the Waldorf-Astoria, New York, June 2-4. Speakers in various industry groups will include David F. Austin, vice president, United States Steel Corp., Pittsburgh, J. Oostermeyer, president, Shell Chemical Corp., San Francisco, D. C. MacLea, president, MacLea Lumber Co., Baltimore, and C. Donald Dallas, president, Revere Copper & Brass Inc., New York. R. R. Wason, president, Manning, Maxwell & Moore Inc., New York, and chairman, National Association of Manufacturers, will present the overall viewpoint of industry. Labor problems will be discussed by Leo H. Wolman, National Bureau of Economic Research Inc., New York, and H. Thomas Austern of Washington will speak on legal problems.

Forums covering textiles, fuels, containers and education will also be held during the three-day convention.

WAA To Donate Surplus Tools For Public Use

New policy allows federal, state and local government-supported groups to receive unsold tools

DISPOSAL of surplus machine tools by donation to government institutions and non-profit organizations is the latest step in War Assets Administration's program to speed the liquidation of its inventories. Under the new plan any machine tool will be made available for donation to any federal, state or local government-supported non-profit educational, health or charitable institution after being offered at a fixed price to priority claimants and commercial buyers.

For the first time since the government agency began its surplus liquidation work, state and local governments will be the beneficiaries, WAA stated. The action came as the result of intensive surveys of the needs of governmental bodies, and, according to WAA, the new program 'will permit every taxpayer in the nation to reap interest from the investment made in war property."

Under the program, which became effective May 6, no machine tool will be offered for sale at competitive bid before it has been made available for donation. A period of 30 days following the close of a fixed price sale will be allowed for donation requests.

Steelworkers' Wages 44.4% Above First Quarter, 1946

Wages and salaries of employees in the iron and steel industry in the first quarter of 1947 increased 44.4 per cent over the comparable period of 1946, when the industry was strike-bound, the American Iron & Steel Institute reports. Payments were approximately $445,820,000, compared to $308,646,000 during the first three months of 1946.

Total employees in the iron and steelmaking companies in March increased to 608,800 workers, of whom 519,100 were wage earners. In February total employment was 606,700 of whom 517,500 were wage earners.

During March, average hourly earnings of hourly, piecework and tonnage workers increased slightly to $1.379, almost equalling the January record of $1.381. Average hours worked in March totaled 38.2 per week, slightly below the 39.0-average of February.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Military making significant progress in development of new weapons for defense and offense in event of another war. Helicopters to lay pipelines from air, obviating necessity of building roads to theaters of operations

STEADY and significant progress is being made by the military in obsoleting old weapons of war and replacing them with new. Due to the feverish efforts of the service units, hardly a month passes without accomplishment of some major step to modernize this country's fighting equipment. Military leaders realize that "wars cannot be won by the weapons of previous wars."

Much of this work, such as the technique which the Navy is evolving to nullify the threat of fast submarines of great cruising range in a future war, is under wraps. But enough information is available to give industry an inkling as to the types of weapons it will be called on to manufacture in the event of another emergency.

For example, the Army Engineers are working out a brand-new technique at Fort Belvoir, Va., for laying oil and gasoline pipelines from the air. At a recent one-day show the engineers employed two helicopters in such work. One of them dropped bundles of 8-in. diameter aluminum pipe to waiting ground crews who quickly joined them together. The other unreeled and laid on the ground a 450-ft length of collapsible steel-reinforced hose. What the engineers are trying to do is eliminate the necessity of building roads to enable operation of surface vehicles at pipeline construction and operation sites. If they succeed in what they are trying to do, they will eliminate the need for much roadbuilding and trucking equipment, and for large labor forces and the supplies needed to maintain them.

Another important effort now under way is to develop high-speed guided missiles of long range and susceptible of control during their entire flight to the target. In this work the most spectacular development to date has been the obsolescence of the German V-1 "buzz bombs" that caused so much destruction and worry in World War II. The reason: The new jet fighter planes are at least 100 miles an hour faster than V-1 buzz bombs and can overtake and destroy them in the air before they enter the target area.

V-2 bombs are not out of the window as tactical weapons of war, and are proving highly useful in studies to develop new methods and equipment. They now are equipped with suitable instruments and rocketed to 85 to 125 miles above the earth's surface to collect data on the ionosphere. The information obtained with their help, say Army Air Forces spokesmen, will help in the development of the supersonic guided missiles of the future—to operate at speeds 7 to 10 times faster than the speed of sound. These data also are being used in the development of defenses against guided missile attacks.

CO-ORDINATOR: J. Frederick Richardson, Fairmont, W. Va., has been appointed co-ordinator of information for the House of Representatives. His duties will consist of preparing special studies, questions, answers and information on various subjects for use by the representatives. Mr. Richardson has served as special investigator and research worker for various congressional committees and formerly was a newspaperman. NEA photo

The sensational success already attained in developing high-speed jet planes is only a forerunner, the services hope, of what is to come in the near future. Headquarters for the great research and development program in this connection will be the California Institute of Technology, Burbank, Calif., where a new type supersonic wind tunnel will be constructed at a cost of around $2.5 million. Contracts are due to be let starting late in May, and the tunnel should be in operation early next year. It will be used by the Army Air Forces, the Army Ordnance Department and the Navy to study aerodynamic characteristics of jet and rocket-type engines.

The atomic age, only yesterday a subject for specialized scientists, has arrived for Navy operating personnel. On the basis of the large amount of practical information gained from the Bikini atom bomb tests, the Navy has set up three new sections in its Bureau of Ships to handle nuclear matters "as they will affect design, construction and operation of ships." They are a Radiological Safety Section, to safeguard personnel against radioactivity following atom bomb explosions; an Atomic Bomb Welfare Defense Section to protect ships against atomic weapons; and a Nuclear Power Section, to adapt nuclear power to ship propulsion.

A large corps of draftsmen in the Bureau of Ships now is at work on redesign problems growing out of the Bikini experience. There will be important hull changes. In addition, there will be considerable redesign of ships' equipment. As part of the program the Navy's Office of Research & Development is seeking more rugged alloys for use in certain delicate instrument parts.

Lightweight Alloys Needed

Many projects to be worked on by the War Department's Research & Development Division in fiscal 1948 are of special interest to the metals industries. In particular, there is to be an intensified search for new, lightweight alloys—both ferrous and nonferrous—to reduce the weight of many kinds of equipment, including vehicles, aircraft components, water supply and much other apparatus. Along with this will go an intensified program of welding research.

A special steel study will be aimed at a better knowledge of the factors that influence the fracture characteristics of steels. Tougher and more ductile steel is desired for ordnance, armor, guns and armor-piercing projectiles.

Another study will aim at the development of high-strength aluminum alloys "suitable for armor and to replace steel in the construction of artillery mounts, carriages and other items of ordnance materiel."

Another major effort will be launched

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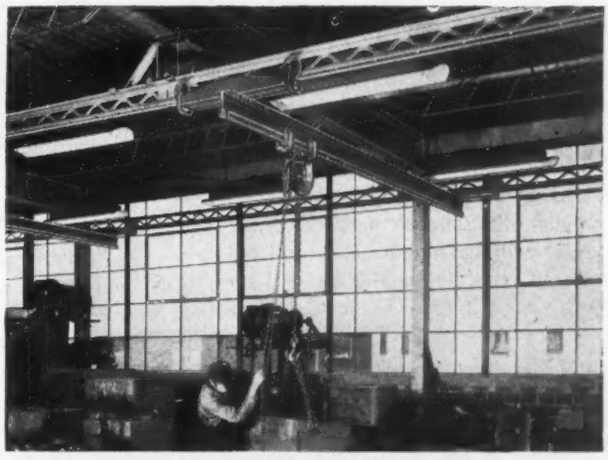

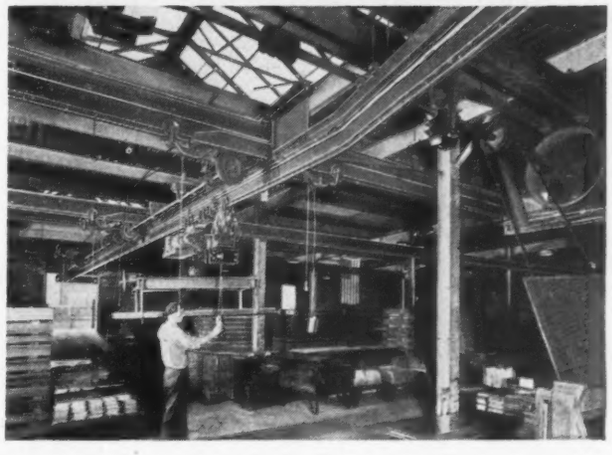

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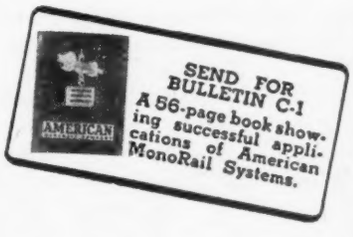

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to develop better heat, corrosion and erosion-resistant steels. Another objective is to identify those steels that will make the least possible drain on our supply of critical alloying elements.

The Research & Development Division envisions the need for larger and heavier equipment to move enormous quantities of earth and rock in building roads and airfields but goes to to state that "this is the least desirable solution to the problem. Emphasis, instead, will be on the development of equipment, methods and materials which will stabilize the natural soils in place."

In the field of vehicles—including tanks—low ground pressure is being sought. Recent tests showed that a vehicle with a unit pressure higher than 5 pounds per square inch is completely incapable of off-road operation in many localities.

Packaging is due for thorough study to eliminate a lot of unnecessary labor and spoilage in World War II. Greater standardization of package types and sizes will be sought. Hand-in-hand will go an effort to standardize and simplify sizes and types of materials handling equipment required by the Army.

Some of the other subjects to be studied during fiscal 1948 are: Development of improved corrosion prevention treatments for aircraft components, as a good rust-preventive compound for use in rubber-metal assemblies; investigation of lead and indium deposition for bearings; development of suitable substitutes for zinc and cadmium plating; development of high-heat resistant alloys for aircraft engines and gas turbines; development of better main bearings for speeds of 10,000 to 20,000 revolutions per minute, etc.

Coal Survey Available

Preliminary estimate of the Bureau of Mines as a result of investigation to date is that there is at least 65 million tons of coal of metallurgical coking grade in the Coal Creek district of Gunnison county, Colo.

Details of the work to date are set forth in Report of Investigations 4104, and copies may be had free by writing the bureau, Washington 25.

Scoff at Labor Bill

Old-time labor leaders in Washington talk somewhat scoffingly about the labor bill on which Congress has been working so diligently. They say that even should the President sign the bill that finally emerges from a House-Senate conference committee, the effect on the unions will not be nearly as restrictive as is generally supposed. The unions, they say, will contest the new law in the courts every step of the way and the net effect, which would probably take several years to become known, probably would be a far less drastic situation as far as the unions are concerned than anticipated.

Whether these union representatives are talking in a spirit of braggadocio and wishful thinking time alone will tell. However, there is a widespread opinion in Washington that the labor legislation approved by the House and Senate will not be so clearly worded as to be proof against legalistic assaults. In large part, this is the result of continual controversy and compromise.

An example of careless wording was pointed out on the Senate floor by Senator Ralph E. Flanders (Rep., Vt.). The definition of the term "supervisor" in the Senate bill, he said, was incomplete because it did not allow for the responsibility of the supervisor in directing other employees of the management.

Definition of "Supervisor" Hit

"As an employer for many years past and until I resigned to enter this body," said Senator Flanders, "I can say that the definition of 'supervisor' in this act seems to me to cover adequately everything except the basic act of supervising. Many of the activities described (in the bill) are transferred in modern practice to a personnel manager or department. The supervisor may recommend more or less effectively but the personnel department may, and often does, transfer a worker to another department on other work instead of discharging, disciplining or otherwise following the recommended action.

"In fact, under some modern management methods, the supervisor might be deprived of authority for most of the functions enumerated and still have a large responsibility for the exercise of personal judgment based on personal experience, training or ability. He is charged with the responsible direction of his department and the men under him. He determines under general orders what job shall be undertaken next and who shall do it. He gives instructions for its proper performance. If needed, he gives training in the performance of unfamiliar tasks to the workers to whom they are assigned.

"Such men," he continued, "are above the grade of 'straw bosses, lead men, set-up men and other minor supervisory employees,' as enumerated (in the report on the bill). Their essential managerial duties are best defined by the words, 'direct responsibility,' which I am suggesting."

Inasmuch as the above constitutes the most complete and comprehensive statement in either house on the exact supervisory responsibility of supervisors, and inasmuch as Senator Flanders' amendment was adopted by voice vote, it no doubt will be the basis of future court decisions involving supervisors—that is, if the bill is not vetoed by the President. The definition, as amended, reads as follows:

"The term 'supervisor' means any individual having authority, in the interest of the employer, to hire, transfer, suspend, lay off, recall, promote, discharge, assign, reward, or discipline other employees, or responsibly to direct them, or to adjust their grievances, or effectively to recommend such action if, in connection with the foregoing, the exercise of such authority is not of a merely routine or clerical nature, but requires the use of independent judgment."

Thus, as a result of the availability of a man of Senator Flanders' experience as a leading employer in the machine tool industry, the latitude for legal quibbling in future cases involving supervisors is considerably narrowed—again assuming that the bill approved by Congress will become law.

Shipping Costs To Stay Up

No early return to the low cargo rates charged on intercoastal and coastwise water shipments before the war are likely, recent hearings before the Interstate Commerce Commission indicate. Under government operation of ships during and since the war operating costs have soared to such an extent that the old competitive relationships have been completely reversed. Whereas the railroads formerly had to grant lower water competitive rates to compete with the water carriers, the ship operators now are trying to get the railroads to quote higher rates to serve as an umbrella for the higher rates now needed by the marine industry.

Leader in the drive to get the railroads to quote higher water competitive rates is the Maritime Commission which is having a hard time in trying to find private operators to take over after the commission's authority to operate ships expires June 30. Maritime Commission representatives declined to illuminate the record with any detailed comparison of present and prewar ship operating costs. They did, however, submit a statement to the effect that intercoastal voyages between Dec. 1, 1945, and Jan. 1, 1947 showed an aggregate revenue of $28,456,229 as against aggregate expenses of $37,552,882. There was no explanation of the loss of $9,096,653, or substantially 25 per cent of the expense outlay. It was intimated, furthermore, that the expense tally above mentioned did not include certain items of cost which private operators would have to pay out of pocket.

Army Investigates Feasibility of Building Underground War Plants

EVER since news began to be received in World War II about the effect of our bombing attacks on enemy production, there has been much talk by highly placed military authorities about the need for locating many industrial facilities underground in the event of another war. But there has been a lack of authoritative information, and many manufacturers who have come to Washington to get advice as to locating contemplated new plants have gone away empty-handed.

This condition now bids fair to be corrected at a comparatively early date. Due to the great and rapid advances in development of bombs and guided missiles, the military authorities finally have come to the conclusion that the use of underground manufacturing sites now is a pressing matter rather than a topic for academic discussion. It is realized that if plants are to be placed underground on a substantial scale for a future war the time to do the job is now.

In general, the War Department is acting on this fundamental concept: "Complete underground structures represent the most practical available protection against air attacks."

In line with this thinking, the Corps of Engineers, United States Army, has contracted with the engineering firm of Guy B. Panero, New York, "to investigate the feasibility and cost of constructing and operating underground plants and storage sites."

On the basis of the experience gained in Germany, the plants to be located underground in the United States will be those engaged in important precision work. Included would be many metalworking plants, such as plants producing bearings, instruments, critical parts.

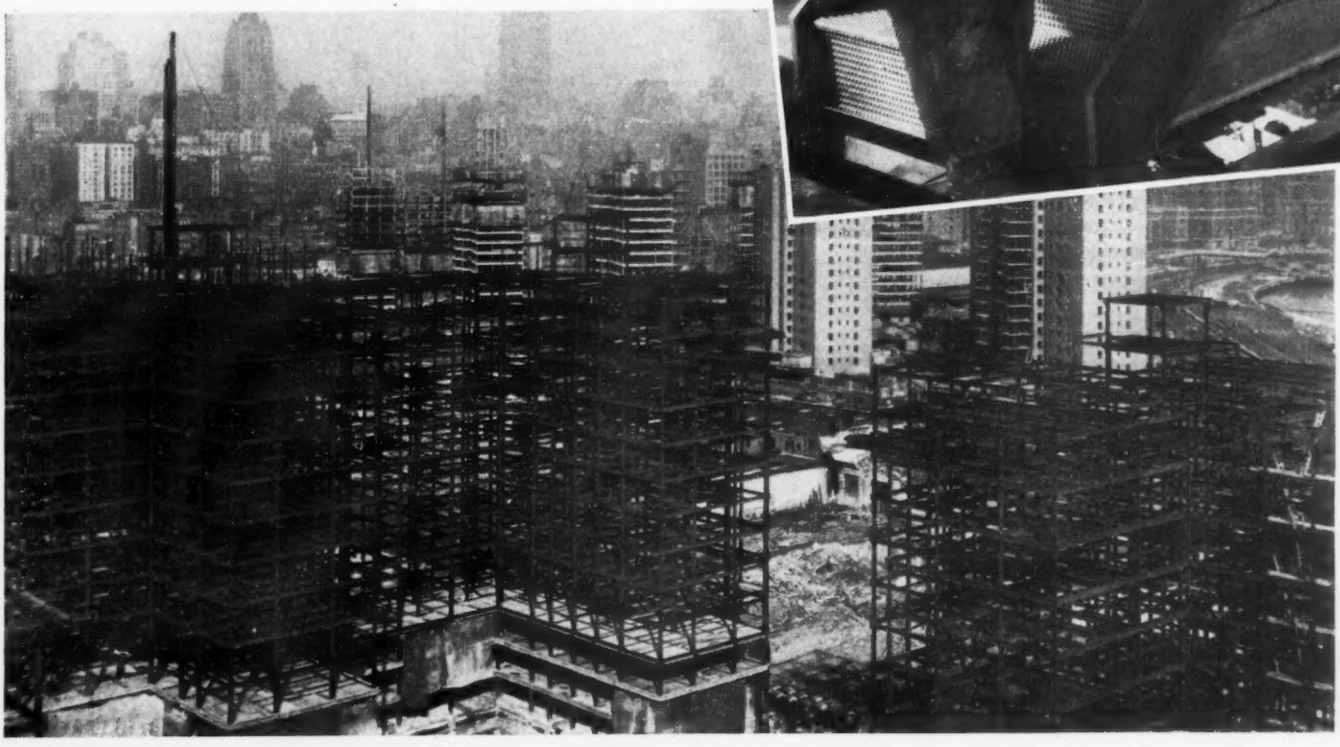
German experience indicated that "underground installations, if adequately planned, could have afforded protection against any type of weapon used against Germany during World War II."

On the basis of present thinking, a surprising variety of manufacturing operations can be conducted satisfactorily in suitable underground locations. Plans are to be drawn, for example, for putting certain chemical production underground. On the other hand, there is no present likelihood that steel plants and foundries will be placed underground. The answer in industries of these latter types, as now conceived, is to keep bomb damage in those industries at a minimum by dispersing the plants widely.

STEEL STAIRS FOR HOUSING PROJECT

A total of 3290 light-weight, all-steel stairs are being installed in three large housing projects being constructed in New York by the Metropolitan Life Insurance Co. Stairs are constructed of Jones & Laughlin Steel Corp.'s junior channels and Jaltread floor plate.

View below shows framework of two of the projects, Stuyvesant Town and Peter Cooper Village, which occupy 27 city blocks on the lower east side of Manhattan. Inset shows individual tread and riser sections, each fabricated from one piece of floor plate, being bolted to strings made of 10 in. 6.5 lb channels.



Production of Steel, Pig Iron In Europe Rises

Sheet output approaches prewar level with continental producers expecting to increase exports

IRON AND STEEL producers in Belgium are dissatisfied with the latest revision in prices in view of more recent advances in coal prices. Coal now selling for 620 francs ($14.10) per metric ton, ex-works, may go still higher.

Under the new steel price schedules billets are quoted at 2450 Belgian francs ($55.60) per metric ton, delivered, merchant bars at $71.60, plates at $73.85 and sheets at $88.65. Pig iron prices are: Foundry grade, 2300 francs ($52.25); and foundry hematite, $62.85. Export prices to Holland have been increased, steel bars to $96.60 and hoops to $102.25, delivered Dutch ports.

Output of Belgian foundries at the beginning of the year was reduced by the fuel shortage, but coal is becoming more plentiful with daily output of 84,000 metric tons equaling average prewar production.

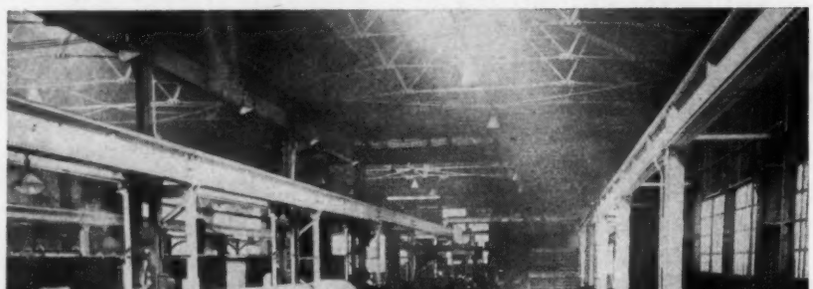
Labor Shortage Less Acute

Labor shortage in the mines is being overcome through greater use of foreign workmen. The government's recruiting program to employ workers from Poland, Italy and the Ukraine is progressing satisfactorily and authorities hope by the end of May to have 10,000 such displaced persons in the mines. There are still some German prisoners so employed, but they are being liberated gradually.

Belgian production of sheets is now at 97 per cent of prewar production and substantial exports are being made. Total exports of iron and steel from Belgium and Luxemburg in February were 148,706 tons against 88,322 tons in January, when the trade was affected by a strike of dockworkers at Antwerp, and 168,986 tons in December, 1946.

Strong competition from South American countries has developed, and as a result, merchant bars have been quoted down to 4300 francs ($97.65) fob for Venezuela. Export trade with European countries having commercial agreements with Belgium and Luxemburg continues heavy, however.

A recent agreement with Norway provides for delivery of 98,000 tons of steel products by Feb. 28, 1948. France, under another agreement, will get 30,000 tons during the current quarter. Other agreements provide for exchange with Turkey, Denmark and Austria. Relations with Bulgaria are also being reestablished.



ARSENAL MAKES FREIGHT CARS: Woolwich Arsenal, London, one of Britain's best known munitions plants, now is engaged in building all-steel freight cars, or wagons as they are known in England. Plant is turning out eighty 16-ton units a day, small cars when compared to American rolling stock. Photo shows underframes on the assembly shed line. NEA photo

The Belgian steel industry is interested in modernization of its facilities; however, shortage of cash and slow deliveries are preventing much progress. Several companies have sent purchasing missions to England and the United States to procure equipment.

In Luxemburg, due to shortage of coke, ARBED, a leading producer, has blown out two blast furnaces since the beginning of the year and has damped a third one. At the beginning of February the company had six furnaces operating out of 17.

France

A feature of the steel industry in France is a notable increase in production of steel sheets. Output in January was 50,000 tons, rate equal to 600,000 tons a year, and above prewar output. Eventually the Monnet plan provides for annual output of over 1 million tons. Imports of plates and sheets in 1946 were 110,000 tons. Imports this year will probably be less.

Allocation of steel for second quarter is 1,400,000 tons against 1,475,000 tons in first quarter and 1,547,000 tons in last quarter of 1946. Reduction is due to the recent fuel shortage. The allocation includes 50,000 tons of imported steel. Actual needs of consumers are estimated at 2,800,000 tons.

Germany

There has been an improvement in production of coal in the Ruhr basin, and it is thought output this year may reach 75 million tons, compared with 54 million in 1946. Steel output is improving, and may reach 4 million tons for 1947.

Breaking up of large German iron and steel concerns in the British-American zone has started, and one iron and steel works had been detached from each of these four concerns: Vereinigte Stahlwerke, Gutehoffnungshutte, Klockner and Otto Wolff. At first the detached works will enter into leases with the original companies. The new companies are expected to operate for a time at a loss, which will be made up by increases in prices or by subsidies. At present, an increase in the price of steel of 54 marks a ton is proposed. During this year, about 20 to 25 such independent companies will be set up.

Netherlands

In the list of suppliers of iron and steel to the Netherlands in 1946, the

United States ranked third with 113,000 tons. The largest supplier was Belgium and Luxemburg with 348,000 tons, followed by Great Britain with 145,600 tons. Total imports of iron and steel into the Netherlands were 639,000 tons.

Czechoslovakia

Despite the severe winter, production of iron and steel in Czechoslovakia was well maintained and output of railroad rolling stock, machinery, plant and equipment has in many cases exceeded targets set in the two-year plan. Owing to increased costs, the government has approved price increases of about 25 per cent for steelmaking pig iron and 26 per cent for rolling mill products. The price of foundry pig iron was reduced by 13.5 per cent, however.

Poland

Output of pig iron in Poland is reported on the upgrade, and it is expected some tonnage will be available for export. In January output was 54,800 metric tons; steel ingots and castings, 110,000 tons; and finished steel, 90,000 tons. These figures, however, were short of schedule because of severe winter conditions and transportation difficulties.

Scandinavia

The iron and steel works at Mo i Rama, Norway, will have the world's largest electric blast furnaces, it is claimed. Three of these furnaces, with total capacity of 180,000 tons a year, have been ordered from a Norwegian firm. The plant is expected to be in operation by 1950 or 1951.

Allocation of 45 million kroner is being sought from public funds for extension of the government-owned Norrbottens Jaernwerk in Sweden. Proposed capacity is 300,000 tons of rolled steel a year and 150,000 tons of pig iron for sale.

Elektrokemisk A/S, Oslo, Norway, has received a contract from Mysore Iron & Steel Works, Mysore, India, for installation of an electric pig iron plant, to consist of two Tysland Hole furnaces, each of 13,000 kva capacity.

Dominion Steel To Curtail Shipments to Great Britain

Arthur Cross, president of Dominion Steel & Coal Corp., Sydney, N. S., Canada, stated recently the government has further curtailed shipments of steel to Great Britain in an attempt to meet Canadian requirements more adequately.

British Steel Industry's Plans For Modernization Progressing

Iron & Steel Board chairman says general approval for projects to cost about £100 million has been obtained. Coal shortage continues to hamper production. Cabinet members disagree over principles in nationalization scheme

BIRMINGHAM, ENG.

MORE THAN half of the projects to modernize the British steel industry have been approved and work has begun on many of the new facilities, Sir Archibald Forbes, chairman of the Iron & Steel Board, disclosed recently.

Reviewing the Iron & Steel Federation's program, which when completed will cost £168 million, he said projects to cost approximataely £100 million have been generally approved and two-thirds of these have been approved in detail. Further projects costing about £20 million are under consideration. Ten per cent of the total modernization had been licensed and begun before the board was established, he added.

Shortage of coal continues to hamper the industry's production, which at the end of March was at an annual rate of less than 11,500,000 tons, he said, and the gap between estimated annual demand of 15 million ingot tons and supply seems unlikely to be bridged by imports.

It was hoped last year, Sir Archibald said, at least a large portion of the difference between supply and demand for steel could be made good by imports, but only about 412,000 tons were obtained from all overseas sources, including 230,000 tons from the United States, 101,000 tons from Australia and 68,000 tons from Canada. Imports in the first quarter of 1947 from all sources were under 120,000 tons, but showed some improvement over last year's comparable figure.

Although currently steel production is improving, he reported, coal supplies are still far below full requirements and until more is known about the level of coal supplies for the remainder of the year, it will be impossible to forecast steel output with any certainty.

Conversion from coal to oil in some steel plants has reached the point where oil consumption is at the rate of 250,000 tons a year, which represents a saving of 450,000 tons of coal a year. It is hoped by the end of the year that oil consumption will have reached nearly 1 million tons, or a saving in coal of 1,800,000 tons.

Shortage of electric power is impeding the use of electric furnaces to manufacture carbon steel. Introduction of the continuous operation of steel-melting furnaces came into operation this month, and it is too early to estimate the effect of this action. In a full year the result may be an extra 750,000 tons of steel but full benefits are not expected to be achieved if adequate supplies of fuel are not available.

It is believed the government has definitely decided that nationalization of the steel industry shall be included in its legislative program for the next parliamentary session. This measure will take precedence over that for acquisition of the gas industry which may be attempted next year. When the government has dealt with the gas industry, as it plans during the life of the present Parliament, no further nationalization proposals are expected until a fresh mandate has been obtained from the electorate.

Type of Control Undecided

Thus far the nationalization scheme for the steel industry is in little more than sketch form. The cabinet has discussed the outline submitted it by the Minister of Supply but has not reached agreement on some of the general principles. Ministers are undecided as to whether the government shall acquire the industry outright or merely a controlling interest in it.

One authoritative report has it that the cabinet is considering a scheme that involves formation of a government holding company to purchase the shares of the leading steel companies. The companies, under government ownership, would be operated individually under their old names.

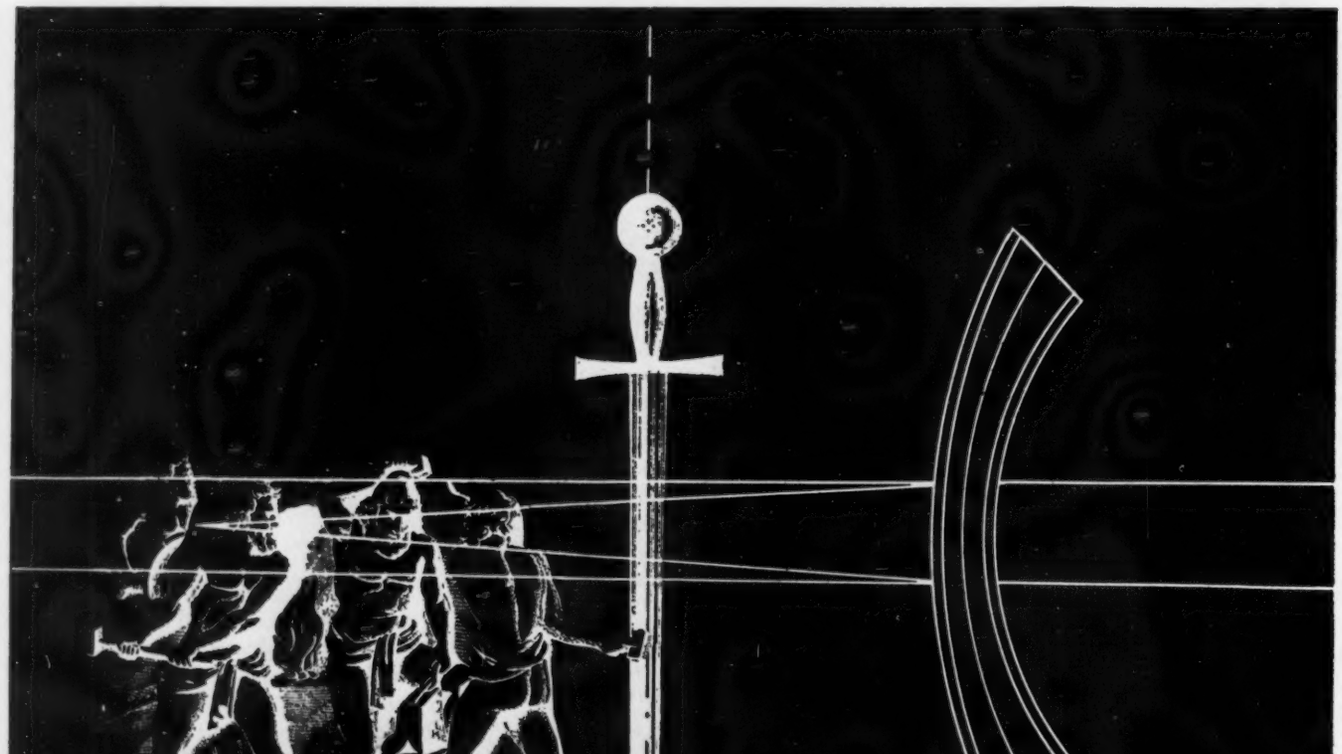
Another point under consideration is the definition of the undertakings to be included in the measure. To determine where the steel industry ends and complementary industries begin is expected to prove one of the most difficult problems to be solved.

The Steel Co. of Wales has been formed with capitalization of £40 million and in addition has been granted borrowing powers for a similar amount. The company aims at completing the modernization of the South Wales steel and tin plate industry and selling its products on a world-wide basis.

ONE CAME BACK

One of the legends surrounding the making of Damascus sword blades is that the smiths developed a delayed quench consisting of thrusting the heated blade into the body of a slave. This gave the required properties, but it was prodigal of manpower, and inconvenient besides. The smith usually had to leave town to do his heat treating in quiet.

Today, metallurgists can obtain properties they need in steel by simpler, less improvident means. A little molybdenum is one way of doing this. It is a proved means of obtaining the hardenability that assures good performance in service. Practical working data on molybdenum steels are available from Climax upon request.



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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Shortage of steel sheet causes auto assemblies to slow down. Estimated 60,000 workers laid off and many plants are closed to build up inventories to working level. Builders hope supply situation will be easier by July

DETROIT

PREDICTIONS in the local steel trade last December that auto plants by spring would feel the effects of the steel industry slowdown occurring at that time proved correct as a dozen or more body manufacturing and assembly plants closed last week after exhausting stocks of critical sizes of sheet steel. A week ago there were an estimated 60,000 laid off throughout the industry, although this figure has been tempered somewhat by reopening of some Fisher Body plants at midweek.

The Fisher Pontiac plant closed May 7 and reopened May 13 because of several short items. Fisher No. 1 plant in Flint ground to a halt early last week. Fisher Lansing closed May 8 after running out of hot-rolled steel for closed body front end frames. The Grand Rapids stamping plant cleared its stocks of sheets for roof and quarter panels and slowed operations to a point where loss of 3000 bodies was foreseen. Fisher has been frantically shifting steel stocks around among its various plants and among other General Motors plants in the effort to keep up with the high volume of overall production. By this means it has been possible to keep a small float but it was gradually being whittled down until there was nothing left to do but suspend operations temporarily.

Briggs Forced to Close

Meanwhile Briggs Mfg. Co. likewise saw its steel inventories dwindling to the vanishing point, and similar action was necessary, forcing suspension of all Chrysler Division assembly operations from May 10 to May 20. This may mean the loss of some 15,000 passenger car assemblies immediately and more in succeeding weeks since it will take time to fill the body pipelines. Nash and Packard both have met interruptions of like character from shortage of body steel.

The breathing spell, to use a kind word, does not spring from any decline in shipments from steel mills, except for the 6-day tieup at Inland Steel in Chicago. Rather, it is the outgrowth of a steady "eating up of its fat" by the automotive industry in the hope that steel shipments would improve sufficiently in the first four months of this year to restore normal floats. It was only a hope, for most auto companies had been assured by their steel suppliers additional material would not be forthcoming. In fact, there has been a carry-over in scheduled shipments from month to month which can never be made up. To erase this carryover, some steel suppliers are telling their sheet and strip customers to expect a 25 per cent reduction in shipments over the next few weeks, which is more bad news.

All kinds of weird reports circulated in the wake of the automotive shutdowns, even such fantastic conjectures as the auto industry reducing assemblies because of a fear of over-production which might necessitate a price cut. Any steel salesman in Detroit will confirm the fact he is constantly hounded, prodded, pressed and cajoled by plants clamoring for more sheet and strip, and he can see no "daylight" in the steel picture before the end of the year. Automobile executives are more optimistic, many of them feel by July the supply situation will have eased and production for the second half will soar to new high levels.

Probably some of this cheerful feeling is based on prospects for the new cold mill of Great Lakes Steel Corp. here coming into production shortly. Present prospects suggest this plant will not be operating before fall, construction work having been repeatedly delayed by strikes and shortages.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	442,242	140,738
April	452,157*	248,108
May	.....	247,620
June	.....	216,637
July	.....	331,000
August	.....	359,111
September	.....	342,969
October	.....	410,510
November	.....	380,664
December	.....	380,908
12 ms.	.....	3,268,456

* Preliminary.

Estimates for week ended:

April 26	102,447	64,559
May 3	101,690	67,060
May 10	93,369	71,355
May 17	70,000	48,565

Foremen Threaten Strike

Ford was not immediately affected by any depletion of steel inventories. More dangerous there was the possibility of foremen going on strike. The Foremen's Association of America has filed strike notice which expired last Saturday, and a strike vote held May 11 reportedly was approved by a large majority of those present. Mr. Ford and John S. Bugas, director of industrial relations, were invited to attend this "meeting" which proved in reality to be a strike rally. They naturally refused and Mr. Bugas addressed a letter to the president of the FAA, pointing out that the company was perfectly willing to continue discussions with the group, with the understanding foremen are distinctly members of management. Significantly, he concluded by declaring if the FAA did not agree on these points then "perhaps this is as good a time as any to settle those issues."

The FAA is seeking a "closed shop" for foremen, checkoff of association dues and assessments, rigid seniority rules and inclusion of general foremen under the agreement. The company objects to all these provisions but has agreed to continuation of the terminated agreement as far as recognition is concerned. A strike for Ford foremen probably would be followed by refusal of UAW-CIO workmen to cross picket lines and operations at the Rouge Plant would stop. A close connivance between the FAA and the UAW-CIO has been suspected since the start of the foremen's organization several years ago.

For their part, the foremen, through their union organization, were reported as wanting to go a little slow in calling a strike, as they suspected the company might have to slow operations because of the steel problem, in which case a strike would hardly be effective.

Watch Tool, Die Programs

Close watch is being kept on impending tool and die programs for 1948 models, with a large volume of business said to be on the verge of being placed

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JEEP TRUCK: A new adaptation of the Jeep is this truck by Willys-Overland Motors, Toledo. It features a 60 hp Jeep engine, 118-in. wheelbase, is offered in seven body styles, with 4700 to 5300 lb gross vehicle weight and payload capacity of ¾ to 1 ton

by both Ford and Chrysler. Ford, of course, can handle a large share of its tooling in the Rouge tool and die shop, and according to the trade, is planning to handle the standard sedan model there, placing tools and dies for deluxe and other models on the outside. Delay in placing the program springs from the high prices being quoted by Detroit tool and die shops, and Ford is said to be contemplating taking the work outside of Detroit to save on costs. Even should this be done, it is likely some of the work would have to be farmed back to Detroit shops, so local tool and die interests are not too worried.

Further than that, local tool and die shops are not overly busy at the moment. One of the largest companies in the business, normally employing about 400, now is loafing along with about 50 men. Only two of the larger shops are busy in the accepted sense of the word. Thus, if the usual tough competition among Detroit shops should develop, conceivably prices might come down. Much may depend upon the outcome of negotiations now in process with the tool and die worker's union on wages. Now averaging around $2 an hour, it is difficult to see how rates can go much higher and business be retained by local shops. Just recently a job on which a plant here bid around $35,000 finally was placed in Indiana on a bid of $24,000. Just how the latter company could work out a saving of 33 per cent is a mystery, since cost of materials and labor would be about the same as in Detroit.

Delay in awarding the Chrysler die program for 1948 is puzzling. One suggestion is that it may be due to the absence of K. T. Keller, who has been recuperating from an operation. He has always kept in close touch with new tooling programs. The trade is looking for a large expenditure by Chrysler for new models, one interest reporting some seven separate roof dies alone are expected, and you do not buy these for peanuts. Possibly the delay in the Chrysler jobs could be explained by a desire to keep a close watch on the competition to avoid being outsmarted on any radically new design.

Jeep Trucks Introduced

Third and fourth units in the line of utility vehicles built by Willys-Overland Motors in Toledo have been announced. They include a two-wheel drive general purpose jeep truck on 118-in. wheelbase, and a jeep panel delivery truck on 104-in. wheelbase. The larger truck has a vehicle weight range of from 4700-5300 pounds and will carry a 3/4 to 1 ton load. Both models feature the traditional jeep front end, utility fenders and the jeep engine. The panel delivery truck comprises a steel panel body mounted on the jeep station wagon chassis, and with this exception is completely interchangeable with the station wagon.

Ford Decentralizes

Ford's Lincoln and Mercury Division is being more decentralized from the principal Ford operations, and the next series of models in these two makes will reflect this fact. The Lincoln is slated to have a V-8 engine instead of the present 12, but with higher horsepower and same wheelbase. Three models are contemplated — standard, custom and continental, priced in the range from $2000 to $3500. The Mercury styling will be completely different from that of Ford and will be aimed at the market in the Dodge-Pontiac class.

Modernization of the Lincoln plant is proceeding apace, without interrupting current production. Foundations are in for a new 704-ft assembly line. A new rustproofing booth has been installed in the body-in-white department, capable of spray treating eight bodies at a time. Cylinder block machining is to be done eventually at the plant and a new gravity roll system is being set up, together with washing booths and tanks for cleaning the blocks.

Parts Shipments Heavy

Buick has shipped more than 21,000,000 lb of service parts to dealers since Jan. 1, a quantity representing more than half of the service parts shipped during all of 1946. This record is typical of service parts business generally throughout the industry.

Chrysler To Expand in East

Chrysler has acquired a large tract of land at Newark, Del., and plans ultimate erection of a 600,000 sq ft parts manufacturing and distribution plant, with the possibility it may later also become the first Chrysler assembly plant in the East.

K-F Production Up

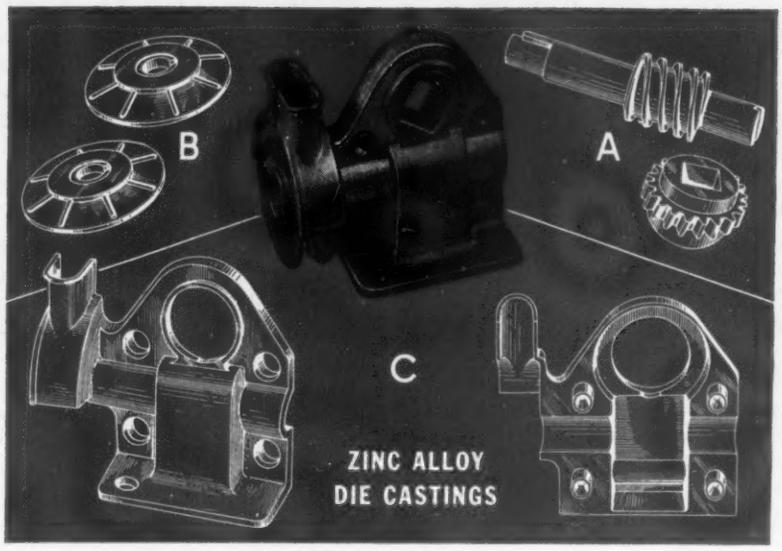
During the first four working days of May, Kaiser-Frazer shipping department checked 2048 new cars out of the Willow Run plant, the figure amounting to almost 20 per cent of the 11,000 cars scheduled for this month. A new daily high was set on May 3, with 955 cars sent on their way. The Detroit K-F engine plant in April completed 6500 engines, and this month 8775 are scheduled, indicating the bottleneck in engines may have been finally broken.

Chevrolet Truck Changes

Chevrolet Truck Divisions have closed for changeover to new series of models, which will be announced shortly. Principal features include new colors, cabs sealed more tightly against the weather and equipped with radios and thermostatically controlled heaters.

Makes Wheels on West Coast

Norris Stamping & Mfg. Co. in Los Angeles is installing a new manufacturing line to produce wheels for Chevrolet assemblies on the West Coast and expects to move production up to 100,000 per month shortly.



ALLOY SELECTION

The performance of all die castings is based on both good design and proper alloy selection. The *zinc alloys*, covered by specifications of both the American Society for Testing Materials and the Society of Automotive Engineers, can provide the mechanical properties given in the table below. Your die caster understands the necessity for careful control with respect to every element involved in alloy formulation to assure maximum mechanical properties and dimensional stability.

FASTENING EXPEDIENTS CUT COSTS

In designing die castings, take full advantage of the possibilities of providing cast fastening elements—rivets, studs, lips, lugs or other projections which can be staked, headed, spun, bent or otherwise deformed to achieve rapid, economical fastening of mating parts. Speed nuts or clips can be used on cast studs, shanks and bosses (see illustration below), or such projections can be threaded or tapped to receive ordinary nuts or screws.

The venetian blind operating device pictured above is an assembly of six *zinc alloy* die castings—with no additional fastening components required. The worm gear shaft (A) has a cast key at one end which is inserted in the slots provided in the center holes of the two flanges (B). These flanges constitute the cord sheave, and they are permanently attached to the shaft by the simple expedient of spinning over the shaft's hollow end. Assembly of the device is completed by inserting the four rivets on one half of the main housing (C) in cored holes in the other half and spinning over the rivet heads. The spinning operations are rapid and economical—thanks to the ductility of *zinc alloy*.

MECHANICAL PROPERTIES OF ZINC ALLOYS FOR DIE CASTING

PROPERTIES*	ZAMAK†-3 A.S.T.M.-XXIII S.A.E.-903	ZAMAK†-5 A.S.T.M.-XXV S.A.E.-925
Charpy Impact Strength Ft.Lb., ¼"x¼" Bar, as cast	43	48
Tensile Strength, Lbs./Sq. In.	41,000	47,600
Elongation, % in 2 In., as cast	10	7
Brinell Hardness	82	91

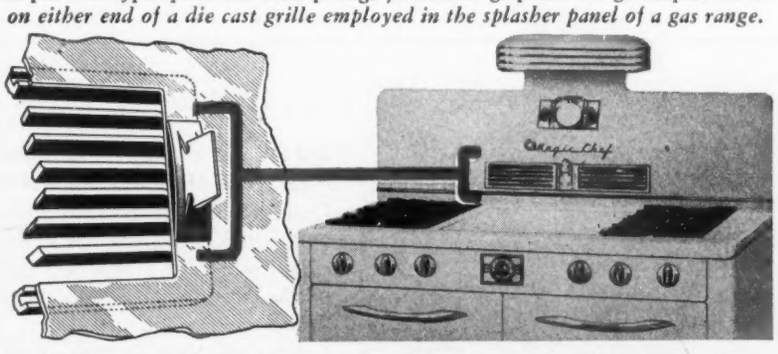
*Properties are as determined on the Zamak alloys. These values, as cast, are well above the minimum A.S.T.M. and S.A.E. requirements.

†A trade mark (registered in the U. S. Patent Office) identifying the zinc alloys developed by The New Jersey Zinc Company and used in the die casting industry.

For additional data on die casting design ask us—or your die casting source—for a copy of the booklet "Designing For Die Casting."

Send for your copy

A push-on type speed nut with prongs formed to grip the wedge-shaped studs on either end of a die cast grille employed in the splasher panel of a gas range.



The New Jersey Zinc Company, 160 Front St., New York 7, N. Y.

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Cleveland-Cliffs Now Operating Sixteen Mines

Ore shipments by company in 1946 declined 20 per cent, but annual report shows gain in net income

EXPANSION of its ore mining interests is stressed by the Cleveland-Cliffs Iron Co., Cleveland, in its annual report to stockholders. The company, in 1946, operated or managed eight underground mines in Michigan and five open pit mines—four on the Mesabi range in Minnesota, and one, a siliceous mine, in Michigan. Sublease of three mines from International Harvester Co., Chicago, on Mar. 1, 1947, raised its total of operating properties to 16, with nine in Michigan and seven in Minnesota.

During 1946, the company acquired the overlying leasehold interest in the Canisteo mine at Coleraine, Minn., when the Canisteo Mining Co., in which Cleveland-Cliffs had a two-thirds ownership, was liquidated. An open pit mine, it shipped 535,542 tons of ore during the year. The Princeton mine, owned in fee, and located in the east Marquette district, was abandoned during the year, when water which accumulated in the ore body during a strike in the first quarter of 1946 made rehabilitation prohibitively expensive.

Shipments of iron ore produced by the company's mines during the year amounted to 4,353,100 tons, as compared with 5,433,810 tons in 1945, a decrease of 20 per cent. These shipments, plus shipments of purchased ore for the company's account, totalled 7,031,321 tons in 1946, or 12 per cent of the total Lake Superior district shipments. During the year, total shipments from United States and Canadian mines in the district declined 21 per cent from the 1945 figure of 76,980,000 tons to 61,028,370 tons in 1946, the report added.

The fourteen vessels owned by the company's subsidiary, the Cleveland-Cliffs Steamship Co., plus three ships operated under a management contract and five vessels chartered from the government, during the year carried 7,281,111 gross tons, of which 5,162,325 gross tons were iron ore. This amount, the report said, was 1,747,468 tons of ore less than had been carried in 1945 and was the result of the strike in the iron ore mines, delays caused by the coal mine strikes and the railroad embargo, and the seamen's strike which did not affect the company's vessels directly.

The company's Coal Department sold 4,250,576 tons in 1946 as compared with 4,427,737 tons in 1945. Coal strikes in the spring and fall caused the small reduction in tonnage. Coal docks at Duluth and Green Bay, Wis., are operated by the company, which also has a majority stock interest in a company operating a similar dock at Escanaba, Mich. The company also owns a half interest in the Mather Collieries coal mine in Greene county, Pa.

Net profit of Cleveland-Cliffs in 1946 after all charges and credits was $4,363,599, compared to $3,709,733 in 1945, the report stated.

Important changes in personnel were reported by the company since the beginning of 1946. William G. Mather, chairman of the board, resigned and was succeeded by Edward B. Greene, who had been president. A. C. Brown, formerly a vice president, was elected president and a member of the board. J. H. Kerr was elected secretary and also acts as office counsel.

Currently the company is considering a plan for consolidation with Cliffs Corp., Cleveland, a holding company which owns all of Cleveland-Cliffs' common stock. A meeting of Cliffs' stockholders which was scheduled for last week and a proposed meeting of Cleveland-Cliffs' stockholders to have been held May 19 have been postponed until an advisory report on the consolidation plan has been received from the Securities & Exchange Commission.

Erie To Build Concentrating Facilities at Aurora, Minn.

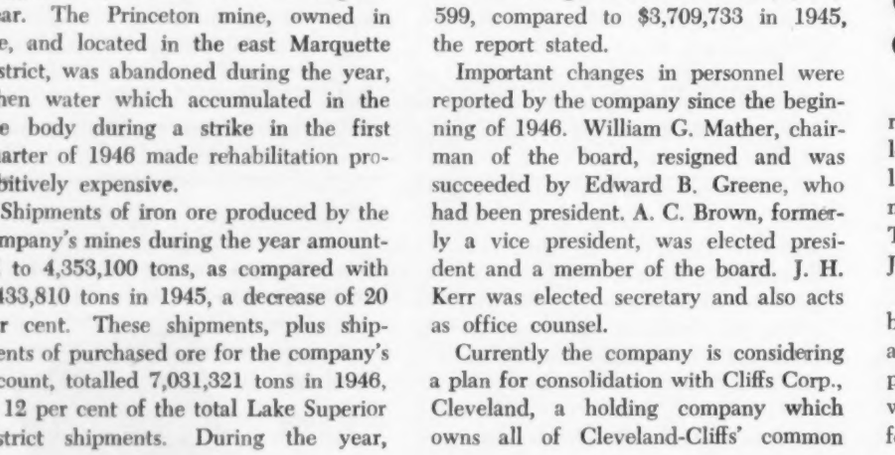
Erie Mining Co. will build a million-dollar pilot plant for concentration of iron ore from low-grade taconite at a site three miles north of Aurora, Minn., on the Iron Range.

Plans had originally been announced last January, but the site had not been selected. Ground will be broken about July 1, and the facility will be in operation by the middle of 1948. To cost between $1,250,000 and $1,500,000, the plant will produce from 175,000 to 200,000 tons of concentrate a year from approximately 600,000 tons of the taconite which contains about 30 per cent iron. The project is viewed as a test by mining officials as to whether the concentration process can be used successfully in the handling of low-grade ore.

Offers Steel Plant in East Chicago for Sale or Lease

War Assets Administration, Chicago, received bids May 16 for purchase or lease of land, buildings and machinery located in East Chicago, Ind., and formerly operated by Youngstown Sheet & Tube Co. under a lease which expires July 30.

Known as Plancor 328, the land and buildings cost the government $795,196, and an additional $1,090,097 were expended for machinery and equipment which included two electric furnaces for manufacture of high alloy steel.



BUSY SHIPYARD: Pascagoula, Miss., yard of Ingalls Shipbuilding Corp. has contracts to last at least until 1948. The yard is building about one-third of the large ships under construction in this country, including two luxury liners for Delta Line, New Orleans, and 14 cargo ships for Brazilian interests

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Schaible Co., Cincinnati, has leased the north shop of the wartime Wright Aeronautical Corp. facilities at Lockland, O. To be used for the production of plumbing fixtures, the facility comprises over 480,000 sq ft of floor area.

—o—

Campion Laboratories, Detroit, division of Campion-Detroit Inc., has moved to 9212 Central Ave. where its research work in industrial instrumentation continues.

—o—

Portland Tug & Barge Co., Portland, Oreg., has filed application for a coastwise operating permit. If granted, the service will be used to transfer the iron and steel of Kaiser Co. Inc. from California to the Pacific Northwest and aluminum products of Permanente Metals Corp. from Tacoma, Wash., to California.

—o—

Metallurgical Sales & Service Co., Hamilton, Ont., Can., has been formed as a manufacturers' agency particularly for firms in the steel industry.

—o—

Westinghouse Electric Corp., Pittsburgh, has started work on equipment for 200 new cars for the subway of New York. To be operating in 1948, the cars will be equipped with four motors each and an electric dynamic braking system.

—o—

Fred S. Gichner Iron Works Inc., Washington, has received a contract for the manufacture of 28 motor truck bodies of special design for Coca-Cola Bottling Co., Richmond, Va.

—o—

Rotary Lift Co., Memphis, Tenn., manufacturer of hydraulic lifts and elevators, has been purchased by G. L. Ohrstrom & Co., New York. There will be no change in the active management and operation of Rotary, nor will the company's policies, products or distribution be affected.

—o—

U. S. Machine Corp., Lebanon, Ind., manufacturer of automatic coal stokers for domestic, industrial and commercial use, has announced resumption of its stoker export business after a five-year wartime lapse.

—o—

Automatic Transportation Co., Chicago, manufacturer of electric industrial trucks, has inaugurated a group insurance plan for its employees which includes increased life insurance policies, sickness benefits, hospitalization and three other major provisions. The company pays for more than half the program.

—o—

SKF Industries Inc., Philadelphia, has stepped up its production of ball bearing tape tension pulleys to 20,000 per month. The firm also plans to increase its output of spherical roller bearings by 50 per cent.

—o—

Electric Machinery Mfg. Co., Minneapolis, manufacturer of electric motors, generators and control equipment, has announced that all quotations on the company's listed products are now being made on a firm basis.

—o—

Nelson Stud Welding Corp., Lorain, O., manufacturer of welding equipment, has appointed Alex Hibbard Co., Denver, as its distributor for Colorado, Utah, Wyoming and parts of Idaho and Montana.

—o—

B. F. Goodrich Chemical Co., Cleveland, announces a change of address for its West Coast office to room 509, 714 W. Olympic Blvd., Los Angeles.

—o—

Menasco Mfg. Co., Burbank, Calif., has suspended production of its portable washing machine and automobile bumper jack until inventories of these items are reduced. The company still produces landing gear, rail and aviation jacks and is carrying on a research and development program on gas turbines and ram jet engines.

—o—

Perfect Circle Corp., Hagerstown, Ind., will award four college scholarships annually to students at Wabash College, Crawfordsville, Ind. Winners of the $200 awards will be free to choose any course of study they desire.

—o—

Carpenter Steel Co., Reading, Pa., producer of tool, alloy and stainless steels, has opened a warehouse and office at 1939 E. 16th St., Los Angeles.

—o—

Stinson Division, Wayne, Mich., Consolidated Vultee Aircraft Corp., produced 316 airplanes during April, a record output achieved through adaptation of assembly-line methods.

—o—

Allegheny Ludlum Steel Corp., Pittsburgh, recently withdrew its $1,250,000 bid on the WAA plant in Dunkirk, N. Y., built by the government during the war for the manufacture of core steel. Company officials said that delay on the bid was retarding plans it had for expansion of the Dunkirk plant.

—o—

Federated Metals Division, New York, American Smelting & Refining Co., held a five-day meeting last week in New York of some of its plant superintendents and production executives for the purpose of co-ordinating production methods and developments.

—o—

Mathieson Alkali Works, New York, has announced that all women employees with ten years' continuous service will get three weeks' vacation with pay, that all men employees with 15 years' continuous service will get three weeks and that all employees with 25 years of service will receive a total of four weeks' vacation.

—o—

Aljon Mfg. Co., St. Charles, Mo., manufacturer of an electrical box connector, is consolidating with Alton Tool Co., Alton, Ill., tool and die maker. Machinery of the Alton firm is being transferred to St. Charles.

—o—

Grinnell Co. Inc., St. Louis, manufacturer of malleable cast iron, has purchased a tract of land containing over 93,000 sq ft of area on Kingshighway, St. Louis, for the site of a proposed plant.

—o—

Office of Technical Services, Washington, Department of Commerce, is offering for sale a report on radioactive materials available during the war in Germany. It is Report PB-44680 entitled *Production of Luminous Compounds at the Works of Auer Gesellschaft A. G.*

—o—

Truck-Trailer Manufacturers Association Inc., Washington, has announced that there is little likelihood of a general price decline in the truck-trailer manufacturing industry.

—o—

Shur-katch Fishing Tackle Co., Richfield Springs, N. Y., has purchased the fish spear manufacturing business of Arcade Mfg. Co., Freeport, Ill., and is moving the machinery and tools to its plant in Richfield Springs.

—o—

General Motors Corp., Detroit, has added three more units to its Previews of Progress program, a popularized science show. One unit will remain in the Detroit area and the others will tour the country.

—o—

Goodyear Tire & Rubber Co., Akron, has produced a 16 mm sound movie entitled "This Way Out." The film depicts conveyor belts at work in underground mines and traces the history of coal transportation.

The Business Trend

Reduced Steel Output Cuts Industrial Pace

INDUSTRIAL OUTPUT receded further during the week ended May 10 and dropped STEEL's industrial production index to 156 per cent of the 1936-1939 average, compared with 159 per cent in the preceding week and 162 per cent in the week ended Apr. 26. The index is now 8 points below the postwar high of 164 per cent attained in the week ended Mar. 22.

Largely responsible for the decline in the week ended May 10 are decreases in steel and automobile production.

STEEL—The decline in steel ingot output, resulting from shutdown of furnaces because of labor difficulties and repairs, lowered steelmaking operations in the week ended May 10 to 92 per cent of capacity, lowest since the week ended Feb. 8. However, an increase in the rate was in immediate prospect.

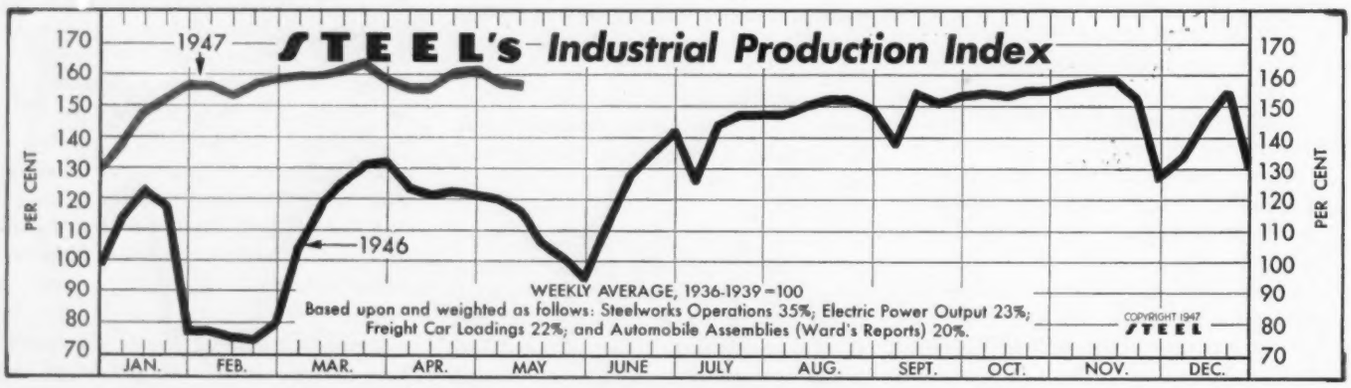
AUTOS—Insufficiency of steel, particularly sheets, is cutting heavily into automobile production. For three consecutive weeks, auto output has been on the downgrade and a further drop in the week ended May 17 is seen, for one large producer has suspended most of its operation for ten days to permit stocks, particularly steel, to accumulate so that a steady production pace can be maintained. Other producers also have had to make some curtailments in operation. The stringency in steel is reported to result from a combination of a high rate of auto assemblies and a shrinkage in the steel supply owing to the coal miners' work stoppage earlier in the year. Estimated production of passenger cars, trucks and busses in the week ended May 10 was 93,369, compared with 101,690 in the preceding week.

COAL—Also down, although only slightly, was bituminous coal production in the week ended May 3, the estimated output for the period being 12,560,000 net tons, compared with 12,670,000 net tons in the preceding week.

PRICES—For the fifth consecutive week, the U. S. Bureau of Labor Statistics wholesale price index declined in the week ended May 3. This put the index down to 146.7 per cent of the 1926 average, lowest since early March. Although it is 33.5 per cent above a year ago, the index for the week ended May 3 was 1.8 per cent lower than it was five weeks earlier.

ELECTRICITY—Rising costs of operation, principally fuel and wages, cut the electric utility industry's first quarter net income 3 per cent below that of the corresponding period of 1946 although revenues in the 1947 quarter rose 11 per cent above the 1946 quarter. Net income in the first quarter of 1947 was $194 million, compared with $200 million in the first quarter, 1946. Revenues in the first quarter of 1947 were $87 million above those of the same period in 1946 but fuel costs rose $45 million and wages $32 million.

CASTINGS—Shipments of malleable iron castings in March totaled 76,614 tons, slightly above February's 74,716 tons. However, new orders booked declined from 55,938 tons in February to 50,194 tons in March.



The Index (see chart above): Latest Week (preliminary) 156 | Previous Week 159 | Month Ago 156 | Year Ago 116

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	92.0	94.0	96.5	55.5
Electric Power Distributed (million kilowatt hours)	4,653	4,640	4,620	3,911
Bituminous Coal Production (daily av.—1000 tons)	2,093	2,112	633	91
Petroleum Production (daily av.—1000 bbl.)	5,005	4,951	4,913	4,749
Construction Volume (ENR—Unit $1,000,000)	$95.2	$102.5	$125.2	$137.6
Automobile and Truck Output (Ward's—number units)	93,369	101,690	97,893	71,355

* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

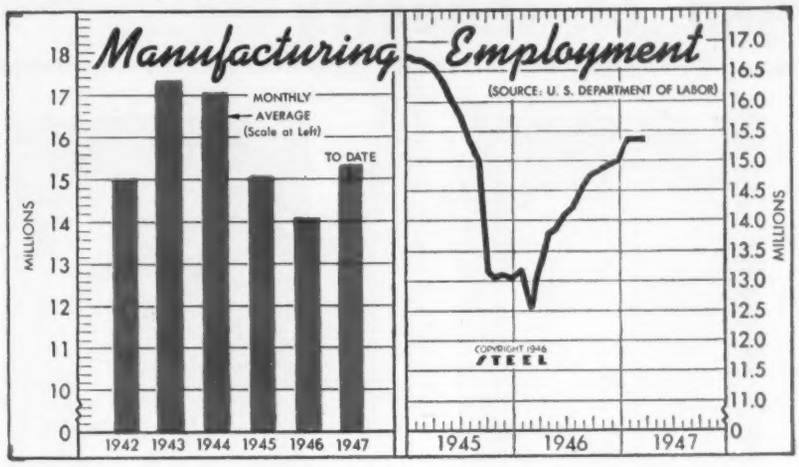
TRADE				
Freight Carloadings (unit—1000 cars)	875†	883	758	685
Business Failures (Dun & Bradstreet, number)	98	70	59	23
Money in Circulation (in millions of dollars)‡	$28,197	$28,118	$28,250	$27,958
Department Store Sales (change from like week a year ago)‡	+12%	+15%	+17%	+29%

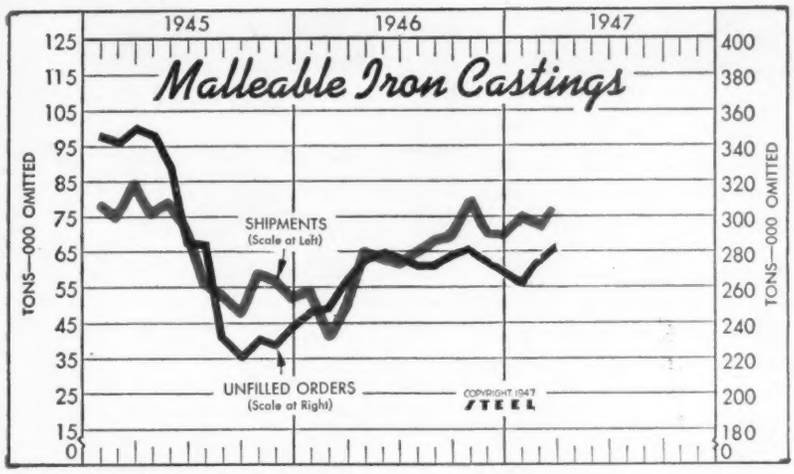
† Preliminary. ‡ Federal Reserve Board.

Factory Employment

(000 omitted)

	1947	1946	1945
January	15,372	13,236	16,696
February	15,481	12,536	16,684
March	15,481	13,206	16,557
April	.....	13,776	16,302
May	.....	13,901	16,012
June	.....	14,098	15,749
July	.....	14,244	15,331
August	.....	14,583	15,019
September	.....	14,731	13,159
October	.....	14,761	13,048
November	.....	14,967	13,110
December	.....	15,026	13,059
Monthly Ave.	.....	14,089	15,060





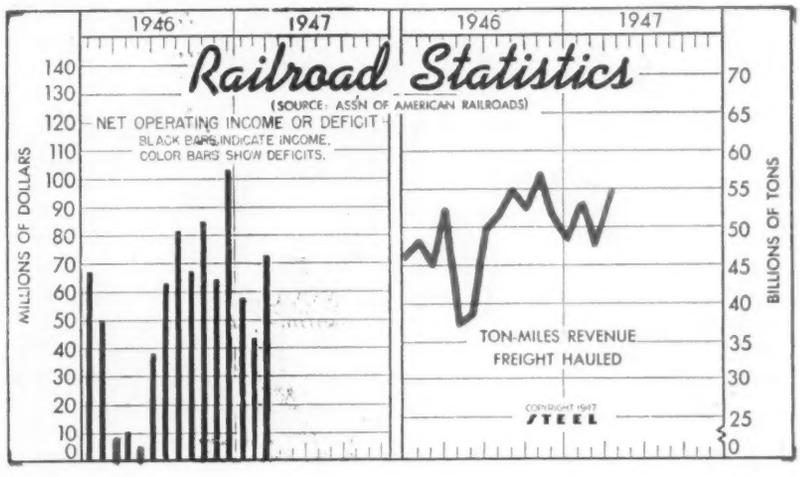
Malleable Iron Castings

	Shipments (000 omitted)		Unfilled orders for castings for sale (000 omitted)	
	1947	1946	1947	1946
Jan.	75.9	54.0	260	246
Feb.	74.7	40.2	274	249
Mar.	76.6	50.2	281	263
Apr.	...	65.0	...	268
May	...	62.6	...	272
June	...	61.6	...	276
July	...	64.4	...	272
Aug.	...	67.9	...	273
Sept.	...	69.5	...	277
Oct.	...	79.2	...	281
Nov.	...	69.0	...	278
Dec.	...	68.3	...	268

Statistics of Class I Railroads

	Net Operating Income —millions—			Ton-Miles Revenue Freight —billions—		
	1947	1946	1945	1947	1946	1945
Jan.	$57.7	$66.7	$76.0	53.3	48.2	56.8
Feb.	43.1	50.5	74.7	48.2	45.1	55.4
Mar.	72.8	*5.7	102.0	55.0	52.4	64.4
Apr.	...	10.1	95.1	...	37.0	61.4
May	...	* 4.8	103.6	...	39.0	64.2
June	...	38.1	99.9	...	50.0	62.6
July	...	62.8	98.8	...	51.5	60.7
Aug.	...	81.7	87.5	...	55.0	56.8
Sept.	...	67.4	43.1	...	52.7	52.6
Oct.	...	85.1	52.4	...	57.0	49.8
Nov.	...	64.1	60.7	...	51.5	49.8
Dec.	...	103.0	42.0	...	49.6	46.3
Ave.	...	$51.6	$78.0	...	49.0	56.7

* Deficit.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,870	$11,208	$10,781	$12,266
Federal Gross Debt (billions)	$257.7	$257.9	$258.0	$262.9
Bond Volume, NYSE (millions)	$16.3	$18.8	$18.9	$22.3
Stocks Sales, NYSE (thousands)	3,703	4,329	4,664	7,427
Loans and Investments (billions)†	$55.3	$55.2	$54.8	$64.4
United States Gov't. Obligations Held (millions)†	$34,745	$34,865	$34,151	$45,993

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$69.82	$69.82	$69.82	$63.54
All commodities†	146.7	146.8	148.8	109.9
Industrial Raw Materials†	159.4	161.3	164.0	123.1
Manufactured Products†	142.2	141.1	142.8	105.5

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

WILLIAM GILLETT

R. C. McKENNA

M. W. REED

William Gillett has been elected a vice president of Detroit Steel Products Co., Detroit. **H. D. Palmer** has been elected a vice president and director of labor relations. Mr. Gillett is chairman of the Metal Roof Deck Technical Institute.

—o—

Grenville R. Holden, formerly assistant to the president, Sylvania Electric Products Inc., New York, has been elected a vice president of the company.

—o—

Walther Mathesius, president, Geneva Steel Co., subsidiary of U. S. Steel Corp., New York, has been elected a director of U. S. Steel Corp. of Delaware. Connected with subsidiary companies of the corporation since 1911, he was named vice president in charge of operations and a director of U. S. Steel Corp., Delaware, when it was formed in 1938, but left a few years later to become president and a director of Geneva Steel Co. during its operation for the account of the government. He continued in these posts when U. S. Steel acquired the company as a subsidiary.

—o—

David Blair Jr., general sales manager, Telechron Inc., subsidiary of General Electric Co., Schenectady, N. Y., has been named vice president in charge of marketing, in addition to his present position.

—o—

Clark E. Korns has been appointed supervisor of industrial relations, Youngstown Sheet & Tube Co., Youngstown, in the company's Chicago district plants. He succeeds **Herman J. Spoerer,** recently transferred to the general offices in Youngstown as director of industrial relations for all the company's plants.

—o—

William B. Anderson has been appointed manager of the Aviation Gas Turbine Division, Westinghouse Electric Corp., Pittsburgh. He succeeds **George H. Woodard** as division manager.

—o—

Roy C. McKenna, president and chairman of the board, Vanadium Alloys Steel Co., Pittsburgh, has been elected president of the Pennsylvania State Chamber of Commerce.

—o—

John F. Considine has been appointed district manager, Chicago, for the American Car & Foundry Co., New York. He previously had been assistant district manager.

—o—

LaMotte T. Cohu, general manager and chairman of the board of directors, Northrop Aircraft Inc., Hawthorne, Calif., has resigned to assume the presidency of Trans World Airlines. **Richard W. Millar** has been elected chairman of the board, and **Claude N. Monson** has been appointed general manager to succeed Mr. Cohu in those positions. Mr. Monson will retain his position as vice president. **B. G. Reed,** vice president in charge of manufacturing, has been named assistant general manager. **George W. Irving,** vice president and general manager of Salsbury Motors Inc., a subsidiary of Northrop Aircraft, has been elected president of Salsbury.

—o—

H. L. Pehrson has been appointed manager of West Coast sales for the Ladish Co., Cudahy, Wis. He will have headquarters in Los Angeles. Mr. Pehrson has been connected with the Reading-Pratt & Cady Division of the American Chain & Cable Co., Bridgeport, Conn.

—o—

William A. Tucker has been named economic analyst and accountant for Prefabricated Home Manufacturers' Institute. He has been economic analyst on the Washington staff of the National Association of Manufacturers.

—o—

M. W. Reed has been elected vice president in charge of engineering, Carnegie-Illinois Steel Corp., subsidiary of U. S. Steel Corp., Pittsburgh. He has been chief engineer of the company since 1939, and previously was vice president in charge of operations, American Steel & Wire Co., another U. S. Steel subsidiary.

—o—

Raymond L. Ward has been elected assistant treasurer and assistant controller of Curtiss-Wright Corp., New York.

—o—

Fred C. Boyce has been re-elected president, D. J. Murray Mfg. Co., Wausau, Wis. **M. P. McCullough** has been elected vice president; **C. E. Staky,** executive vice president and general manager; **A. W. Plier,** secretary and assistant general manager; and **J. S. Alexander,** treasurer. In addition to Messrs. Boyce, McCullough, Staky and Alexander, **D. C. Everest, G. L. Ruder** and **Grover Keeth** have been added to the board of directors of the company.

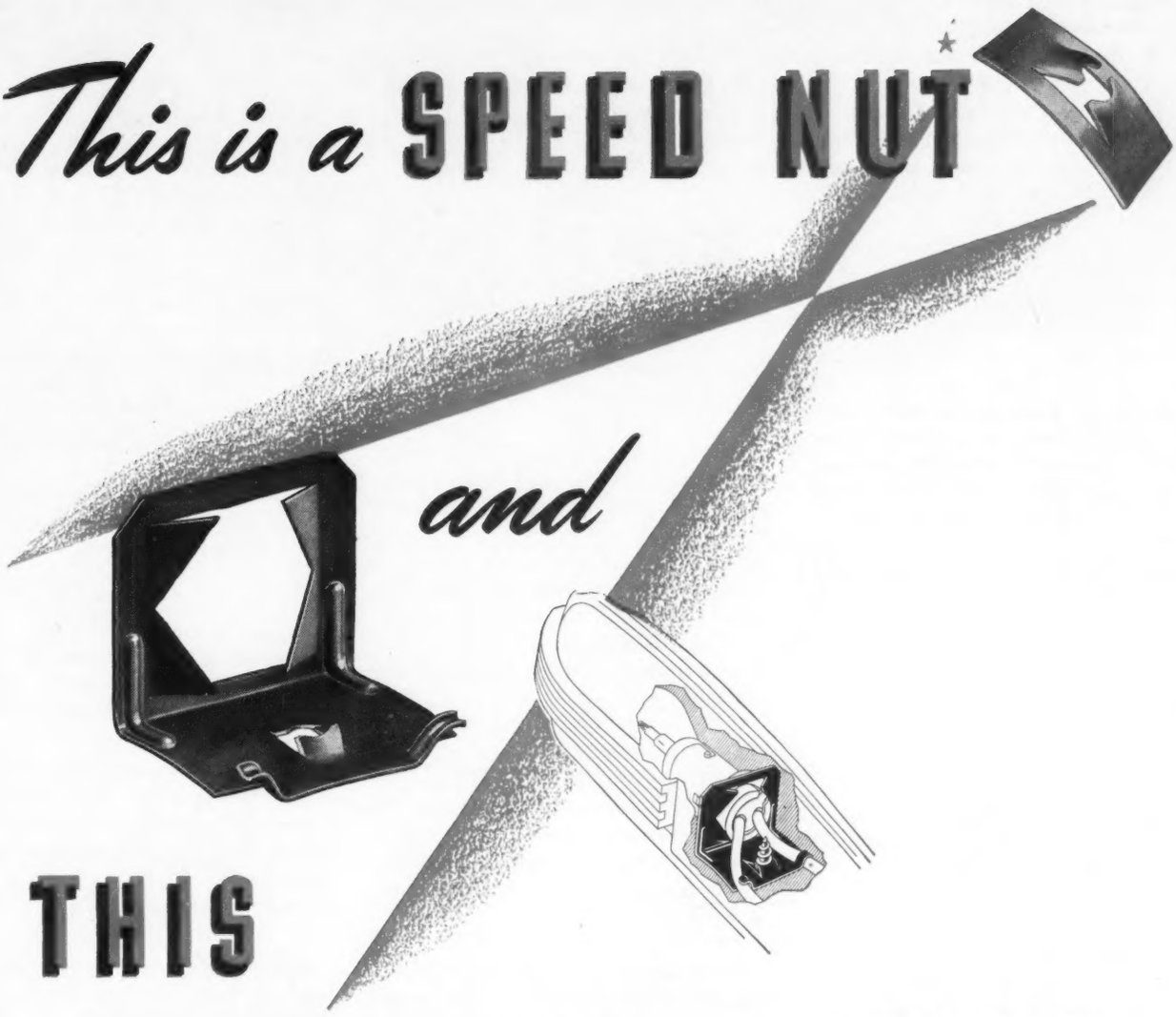
—o—

James C. Travilla Jr., chief mechanical engineer, General Steel Castings Corp., Eddystone, Pa., has been elected vice president in charge of engineering. **James Macdonald,** recently assistant to the president, also has been elected a vice president.

—o—

J. F. Stevenson has been appointed assistant works manager, Grove City, Pa., plant, Cooper-Bessemer Corp., Mt. Vernon, O. He formerly was production manager of the plant. Other appointments at Grove City plant include: **W. A. Luli,** named production manager; **R.**

This is a SPEED NUT*



and

THIS

..is also a Speed Nut!

Take a look at this one SPEED NUT that does *three* jobs. Conceived by our development engineers to simplify automotive parking lamp assembly, it retains light socket, spaces wires and fastens entire assembly to the base. (See sketch). It replaced four separate parts and eliminated three machining and welding operations.

This is but a typical example of the SPEED NUT Savings Factor. So flexible is the basic SPEED NUT principle, it can be incorporated in almost any conceivable shape to improve your product, speed up your assembly, reduce the number of parts and cut costs. We can give you a no-charge fastening analysis that may surprise you. Send in your assembly details today.

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In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London
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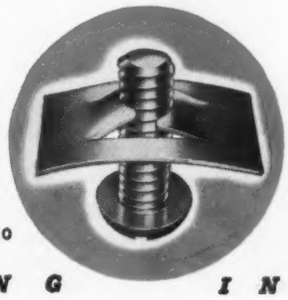
In Australia: Aerocessories, Pty. Ltd., Melbourne



Speed Nuts*
PATENTED
MORE THAN 4000 SHAPES AND SIZES

* Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS

H. Bragg, assistant production manager; **H. K. Stevenson,** general superintendent; and **W. W. Richards,** chief planner.

—o—

Two new sales engineers appointed at the Metal Carbides Corp., Youngstown, are: **R. M. Lindgren,** former chief engineer, Lincoln Park Industries, Lincoln Park, Mich., and **Paul E. Dimling,** formerly connected with the Firth-Sterling Steel Co., McKeesport, Pa. They will maintain headquarters in Detroit, and will cover Michigan, and the Detroit industrial area.

—o—

Charles H. Godschall, recently manager, Metal Division, Philco Corp., Philadelphia, has been named works manager of the new Philco refrigerator-freezer production facilities in Philadelphia.

—o—

Homer Parsons has been appointed director of exports for the American Brake Shoe Co., New York. He has been serving as assistant director of exports.

—o—

K. A. DeLonge, metallurgist, has been elected chairman of the Metropolitan chapter, American Foundrymen's Association. He was vice chairman. Mr. DeLonge is connected with the Development & Research Division, International Nickel Co. Inc., New York.

—o—

Harold F. Ray has been elected secretary and treasurer, Great American Industries Inc., New York. He had been formerly assistant to the president of Wickwire Spencer Steel Co. and Colorado Fuel & Iron Corp., Denver.

—o—

Maj. Gen. Harry C. Ingels, United States Army, retired, has been elected president and a director of RCA Institutes Inc., training affiliate of Radio Corp. of America, New York.

—o—

Edward S. Budd has been promoted to manager, Parts Division, Cooper-Bessemer Corp., Mt. Vernon, O. He is also assistant secretary of the corporation.

—o—

Philip G. Caldwell has been named manager of sales, Transmitter Division, General Electric Co., Schenectady, N. Y. He had been sales manager of television equipment.

—o—

L. J. Amsdell, Acme Rubber Mfg. Co., Trenton, N. J., has been named eastern sales manager of the company, with headquarters in New York. He was formerly western sales manager, Chicago office.

—o—

C. L. Austin, director, treasurer and member of the executive committee, Jones & Laughlin Steel Corp., Pittsburgh, has been elected a vice president of the company.

—o—

W. M. Hicks has been appointed sales representative by Gibson Electric Co., Pittsburgh, to cover the New York metropolitan area, including New Jersey.

—o—

W. S. Harrison has been named buyer-merchandiser of refrigerators, freezers and traffic appliances, Auto & Home Supplies Department, B. F. Goodrich Co., Akron. He previously had been buyer-merchandiser, electronics, and is succeeded by **Frank C. Tobin.**

—o—

Homer A. Rawson has been appointed sales manager in charge of lighting components, General Electric Co., Schenectady, N. Y.

—o—

Walter M. Reynolds has been appointed controller of both the Ithaca, N. Y., and Detroit plants of Morse Chain Co., subsidiary of Borg-Warner Corp., Chicago.

—o—

A. J. Bronold has been appointed general agency and contractor manager, Sturtevant Division, Hyde Park, N. Y., for Westinghouse Electric Corp., Pittsburgh. He had been formerly assistant to the vice president, headquarters sales, at Pittsburgh.

—o—

E. J. Brunning, president and general manager, Consumers Glass Co., Montreal, Que., and recently coal controller under the Right Hon. C. D. Howe, has been elected to the board of directors, Polymer Corp. Ltd., Sarnia, Ont. **Albert C. Guthrie** has resigned as a director.

—o—

George H. Clark, vice president in charge of engineering, Formica Insulation Co., Cincinnati, has been elected president of the Society of Plastics Industry. He had been vice president of the society.

—o—

Martin Oyamburu has been elected chairman of the board of the Compania Hulera "Euzkadi" S. A., Mexico City, Mex., associated with the B. F. Goodrich Co., Akron. **Russell F. Moody** has been elected director general (president), **D. W. Johnson,** sub director (vice president) in charge of production, and **Edmund Phelan,** sub director in charge of sales. These appointments follow the recent death of **Angel Urraza,** former chairman of the board and president of the company.

—o—

F. K. Suddith has been named manager of the Butte, Mont., office of General Electric Supply Corp., Schenectady, N. Y.

—o—

Gaynor H. Langsdorf has been elected vice president and a director of Oronite Chemical Co., San Francisco. He will be in charge of products and processes.

—o—

Gilbert A. Bunn, representative in the eastern Michigan area, Kennametal Inc., Latrobe, Pa., has been appointed manager of the Middle-Atlantic district, with offices in Philadelphia. He is succeeded by **R. H. Oberholtzer** of the Detroit staff.

—o—

Sylvester S. Robinson has retired as foreman of the finishing department of the American Bridge Co., in the Elmira, N. Y., plant. He has been connected with steel fabrication for 48 years.

—o—

Four appointments announced by the Carborundum Co., Niagara Falls, N. Y., are: **Clarence E. Hawke,** director of domestic sales; **Edwin B. Forse,** manager of the Refractories Division; **Boyd H. John-**

MILTON L. GEARING

Appointed general manager, New Departure Division, General Motors Corp., Detroit. Noted in STEEL, April 28 issue, p. 94

A. N. PHILLIPS

Elected vice president, fourth district, National Association of Purchasing Agents. Noted in STEEL, May 12 issue, p. 100

Want to clean STAINLESS quicker and better?

ask EASTERN

REMOVING LUBRICANTS? Will vapor degreasing with perchlorethylene remove sulfurized cutting oils used in drilling holes in ES 18-8 (Type 302) switch plates?

GRIME FROM EXPOSURE? What is the best method of cleaning soot and grime from polished stainless steel without scratching the finish?

LEAD SOAPS? We use a lead soap lubricant in forming stainless plate, but it is difficult to remove. Is there a good solvent for these soaps?

DISCOLORATIONS? Light rust spots have formed on some of our equipment we used to clean with steel wool. Can you suggest a cleaning agent?

COOKING STAINS? Can we use one of the new detergent soaps on our stainless steel kitchen equipment to clean up food stains, without affecting the high polish?

ask

EASTERN for the

answer when

STAINLESS is the

question

To keep stainless steel really stainless, keep it clean. And for methods of cleaning it quickest and best, ask Eastern. Problems like this are answered every day by Eastern Stainless' technical men. Many of the answers are given in the data-packed handbook, "Eastern Stainless Steel Sheets". Write for your copy, and when you need further help, get in touch with our nearest office or distributor. JMLCo E-D1

EASTERN STAINLESS STEEL CORPORATION
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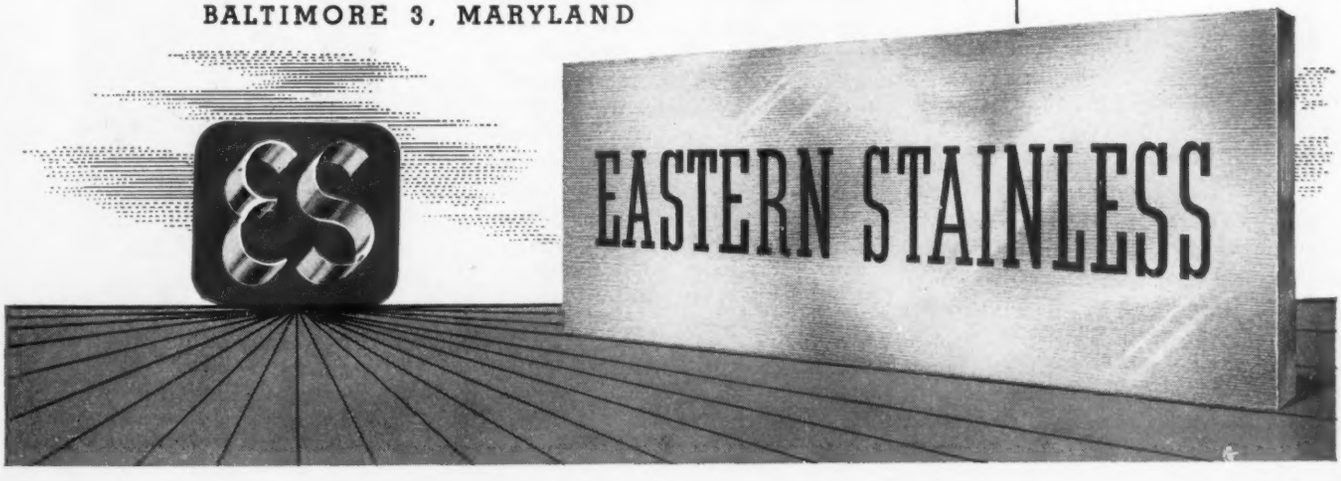

son, manager, refractories sales, and **Russell G. Albertson,** division manager of the Canadian Carborundum Co. Ltd., Niagara Falls, Ont.

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C. T. Goodwill has been appointed manager of sales, Strip Division, Detroit Tube & Steel Co., Detroit. **D. A. Nabb** has been appointed manager of sales, Tube Division. Mr. Goodwill formerly was in charge of sales for Bopp Steel Corp., Dearborn, Mich., and Mr. Nabb was in charge of sales, Detroit Seamless Steel Tubes Co. The new appointments result from the consolidation of the two companies into Detroit Tube & Steel Co.

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J. C. Thompson has been appointed chief process engineer of the Hagerstown, Ind., plant, the Perfect Circle Corp., Hagerstown, Ind. **A. F. Knose** has been made master mechanic of the newly created mechanical department.

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Fred Meyer has been appointed chief engineer, Railroad Industry Division, Nelson Stud Welding Corp., Lorain, O. He has been a member of the sales engineering staff at Owens-Corning Fiberglas Corp., Toledo, O.

—o—

Ernest F. Becher and **J. Allen Ferguson** have been elected to the board of directors, Barcalo Mfg. Co., Buffalo. Mr. Becher is president of Chandler Industries Inc., Buffalo, which is being merged with Barcalo. He has been made a vice president of Barcalo. Mr. Ferguson is a vice president of the company.

—o—

Frederick W. Holler has been elected president of United Aircraft Products Inc., Dayton, O. He succeeds **Samuel F. Baker,** who has resigned. Mr. Holler formerly had been president of two subsidiaries of Sears Roebuck & Co., Chicago.

—o—

Charles E. Pierson has been appointed assistant manager, northeastern region, for the Ford Motor Co., Dearborn, Mich.

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Harold L. Mann has been named chief industrial engineer of Farnsworth Television & Radio Corp., Ft. Wayne, Ind. He formerly had been with Fruehauf Trailer Co., Detroit.

—o—

Herbert C. Guterman, senior vice president and general manager, Arma Corp., Brooklyn, N. Y., has been promoted to president of the company. He succeeds **Arthur P. Davis,** one of the corporation's founders, who remains as a director and engineering consultant.

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Clinton H. Crane has been elected chairman of the board, St. Joseph Lead Co., New York. He is succeeded as president by **Andrew Fletcher,** formerly executive vice president.

—o—

New members of the expanded Contracts Advisory Committee of the Navy Industrial Association are: **B. I. Graves,** vice president, Tide Water Associated Oil Co. Inc., New York; **Charles R. Holton,** vice president, Bethlehem Steel Co., Bethlehem, Pa.; and **R. S. Neblett,** General Electric Co., Schenectady, N. Y. This committee, whose chairman is **Col. A. L. Vreeland,** Celanese Corp. of America, New York, is working with representatives of the Navy in reviewing present contract forms and revising them in the best interest of the government and Navy contractors.

—o—

George R. Wernisch, manager, Steel Joist & Roof Deck Division, Ceco Steel Products Corp., Chicago, has been elected president of the Steel Joist Institute, and **James D. Maitland,** Colorado Builders Supply Co., Denver, has been named vice president of the institute.

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Thomas H. Stambaugh has been appointed sales manager, Aftermarket Division, Monroe Auto Equipment Co., Monroe, Mich., to succeed **John Black,** retired. He had been associated with the Hudson Motor Car Co., Detroit.

—o—

Floyd M. Shumway and **R. S. Oschner** have been appointed district representatives in the north central district for General Electric Co., Schenectady, N. Y. They will cover accessory equipment products, and tungar and metallic rectifiers, respectively.

—o—

Ivan F. Baker has been elected vice president of the Westinghouse Electric International Co., Pittsburgh. He retains his former positions of treasurer and a director of the company.

—o—

C. L. Cummins, founder of the Cummins Engine Co. Inc., Columbus, Ind., has been elected chairman of the board of directors, and **J. I. Miller** has been elected president. Other officers elected are: **V. E. McMullen,** executive vice president; **R. E. Huthsteiner,** vice president and general manager; **H. L. Knudsen,** vice president of engineering; **Carl R. Fox,** vice president and works manager; **D. C. Bottorff,** secretary and treasurer; **R. E. Lay,** assistant secretary and assistant treasurer; and **Edwin G. Crouch,** assistant secretary.

—o—

J. H. Deaderick, a vice president, and **E. L. Murray,** credit manager, Caterpillar Tractor Co., Peoria, Ill., have resigned to become distributors for the company in Arizona. Other personnel changes include the following: **E. W. Jackson** has been named director of parts and service; **M. T. Deames** is promoted to general parts manager, and **W. Blackie,** vice president, adds administrative guidance of the traffic department to his duties.

—o—

Three vice presidents elected by the American Rolling Mill Co., Middletown, O., are: **J. A. Ingwersen,** formerly general manager of sales, has been named vice president in charge of distribution; **C. H. Murray,** formerly director of the Personal Relations Division, has been named vice president in charge of personal and public relations; and **H. H. Tullis,** formerly controller, has been named vice president and controller.

—o—

Logan T. Johnston has been appointed general manager of sales, American Rolling Mill Co., Middletown, O., and **T. F. Olt** has been named director of research. Mr. Olt succeeds **Dr. Anson Hayes,** retired, but who has been appointed director emeritus and will continue to be active with respect to research policies.

—o—

O. H. Shenstone has been appointed factory manager in charge of three of the refrigerator plants of the Norge Division, Borg-Warner Corp., Chicago, to succeed **John C. Buchanan,** who retired as manager of the Norge Division plant in Muskegon Heights, Mich. He has joined the Norris Stamping & Mfg. Co., Los Angeles, as manufacturing executive.

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Edward R. Taylor has been named merchandising manager of Hotpoint Inc., Chicago.

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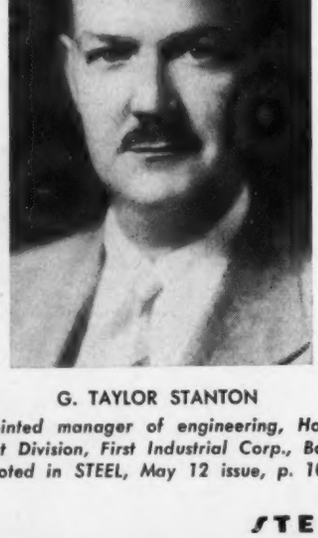
William Mohr has been named regional manager in the Caribbean zone for Borg-Warner International Corp., Chicago. He



G. TAYLOR STANTON

Appointed manager of engineering, Holtzer-Cabot Division, First Industrial Corp., Boston. Noted in STEEL, May 12 issue, p. 101

E. M. WEINFURTNER

Elected a director and president, North American Refractories Co., Cleveland. Noted in STEEL, May 12 issue, p. 100

E. D. COWLIN

Appointed general manager, Reliance Division, Eaton Mfg. Co., Cleveland. Noted in STEEL, May 12 issue, p. 98

ROBERT R. KOVACH

Appointed manager of the new Chicago district office, Electric Products Co., Cleveland. Noted in STEEL, May 12 issue, p. 101

formerly had represented the American Brake Shoe Co., New York, in that area.

—o—

Stephen G. Harwood has been named district sales manager of American Locomotive Co., New York, to succeed **L. S. Peabody** who has been appointed assistant to the vice president.

—o—

Brig. Gen. Hugh C. Minton, who directed the Production Division of the Army Service Forces during World War II, has been named production manager of Koppers Co. Inc., Pittsburgh.

—o—

William T. Gossett, vice president and general counsel, Ford Motor Co., Dearborn, Mich., has been elected to the company's board. He succeeds **Herman L. Moekle,** former vice president, who resigned.

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D. M. Coons has been named manager of the Parts and Service Division, Frazer Farm Equipment Corp., subsidiary, Graham-Paige Motors Corp., Willow Run, Mich. He was formerly service manager for Chandler-Evans Corp., West Hartford, Conn.

—o—

Despatch Oven Co., Minneapolis, correcting a possible misinterpretation in the trade of a published announcement in STEEL (May 5, p. 90) of changes in the company's executive staff as the result of the death of **Herbert L. Grapp,** president, announces that **A. E. Grapp** continues duty as active chairman of the board of the company, and that the policies and program of the organization are the same as those of the late president, being administered by officers who were active in his administration.

—o—

Colgate W. Darden Jr. and **George P. Edmonds** have been elected to the finance committee of United States Rubber Co., New York. Mr. Darden is president of the University of Virginia, and formerly governor of Virginia. Mr. Edmonds is president of Bond Crown & Cork Co., Wilmington, Del. Both are directors of the United States Rubber Co.

—o—

Charles A. Upson, founder and president, Upson Co., Lockport, N. Y., has been elected chairman of the board. **W. Harrison Upson** succeeds as president. **Henry W. Schmidt,** formerly secretary, has been elected secretary-treasurer. Other officers elected were **Roy J. Farley,** vice president in charge of production; **Harry R. Shedd,** vice president in charge of sales; and **O. L. Koehn,** comptroller.

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Herman Kahn has been named lighting draftsman and designer for Cutler Light Mfg. Co., Philadelphia. He had been formerly connected with Westinghouse Electric Corp., Pittsburgh.

—o—

Frank J. Hoenigmann has resigned as executive vice president and a director of Florence Stove Co., Chicago.

OBITUARIES . . .

William Pigott, president and founder in 1942 of the Everett Shipbuilding & Drydock Co., Seattle, died May 8. He was the son of the late William Pigott who established the first rolling mill in Seattle, now the local plant of Bethlehem Pacific Steel Co. He was president of the Seattle Steel Co. and Seattle Brass Co.

—o—

S. L. G. Knox, 76, former vice president and chief engineer of the old Bucyrus Co., Milwaukee, and father of **N. R. Knox,** president of the Bucyrus-Erie Co., that city, died recently.

—o—

George A. Maney, 58, chairman of the department of civil engineering and a professor of structural engineering, Technological Institute, Northwestern University, Evanston, Ill., died May 10.

—o—

George E. Blair, 67, retired superintendent, Hardware Mfg. Co., Milwaukee, died recently.

—o—

Levi W. Moen, 63, former head of the engineering department, Lamson Corp., Syracuse, N. Y., died May 8.

—o—

Carl M. Carpenter, 48, a mechanical engineer, Allis-Chalmers Mfg. Co., Milwaukee, died recently.

—o—

Arthur J. O'Leary, 49, manager, field sales, Lukens Steel Co., Coatesville, Pa., and its subsidiaries, By-Products Steel Corp. and Lukenweld Inc., died May 6.

—o—

Francis J. Revere, 63, a mechanical engineer with the Allis-Chalmers Mfg. Co., Milwaukee, died recently. He had been connected with the company for more than 40 years.

—o—

Woodburn C. Winnings, 54, manager, Mechanical Goods Division, Goodyear Tire & Rubber Co., Akron, and associated with the firm 32 years, died May 10.

—o—

Reginald Steel, 85, president, R. Steel & Sons Inc., Long Island City, N. Y., died recently.

—o—

John M. Singer, 57, superintendent, Cleveland Welding Co., Cleveland, died May 14.

—o—

F. Buckingham, sales representative of the Magnetic Gauge Co., Akron, died Apr. 29, at Franklinville, N. J.

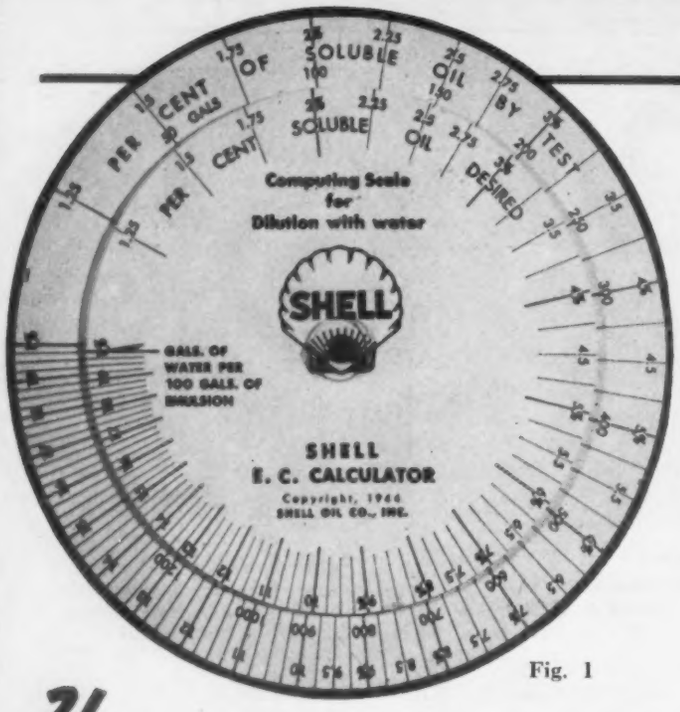


Fig. 1

USE of coolants in the metalworking industry has its origin in man's earliest experience with sharp edged tools. Men who lived in caves and clothed themselves in the skins of beasts they killed with their weapons, fashioned those weapons by means of drops of water falling on heated flint stones to form a sharp cutting edge. Their very lives depended upon their skill in the use of coolants.

Probably every adult today remembers the old fashioned "grindstone" whereon water was employed as a coolant in the sharpening of tools and cutlery. Certainly every tool engineer knows of the early work of F. W. Taylor about 1885 in making the first practical demonstration of the effectiveness of water as a coolant in increasing the production efficiency of machine tools. By playing a stream of water on the tool in a turning operation he discovered that cutting speeds could be increased by about one third. Since that time a tremendous amount of work in this field of metalworking coolants and fluids, such as the research continually underway in Shell laboratories, has brought to use the cutting fluids and coolants we know today.

This development of modern products has entailed at least experimentally, many materials other than water which we naturally associate in our thinking with the subject of coolants. However, since the high efficiency of water as a cooling medium or water in conjunction with other materials is indisputable, and since cooling to one degree or another is requisite to every process fluid used in metal cutting or working, this paper will deal only with the important group of water mixtures or solutions used as coolants in metalworking.

Under metalworking we consider only those processes involving a mechanical changing of shape or size of material, such as cutting, sawing, grinding, drawing, stamping, and to some extent rolling. It is recognized that there are other industrial processes in the metals industry wherein coolants, specifically water coolants, are employed. Such, for example, are quenching of ferrous and nonferrous metals in water or water solutions,

Composition, Control an

the use of water solutions in heat exchangers, and for other heat transfer purposes.

Before discussing the application of coolants in the metalworking processes mentioned, it will probably be desirable to consider several things relative to coolants themselves, such as compositions of typical water soluble or emulsifiable materials, the preparation of aqueous coolants for use, their care, maintenance, and control in use, and the relative suitability of water coolants versus other types of fluids.

Composition: While plain water, as used by Taylor, or an alkaline water solution may be employed as a coolant in metal cutting, the disadvantages of such coolants are well known. They rust work and machines readily, and fail to provide other characteristics essential to modern machining practice.

Two important types of compounds have been developed for use with water in making water soluble or emulsifiable coolants for the metals industry. These are the so-called soluble oil and the paste type compound. The former is usually composed of mineral oil plus an emulsifying agent or soap plus a coupling agent. The emulsifier may consist of sulphonates, acid sludges, glycols, saponified phenols or naphthenic acid, and the coupling agents may be alcohols of several types. The soluble oil may contain fatty oils, fatty acids, "wetting-out" agents, active chemical additives, water softening agents, germicides, and some water. All such soluble oils are usually liquid, and mix readily with various proportions of water to form the coolant used at the machine. Although normally called soluble oils, they are not really soluble, but go into an emulsified state wherein tiny globules of oil are dispersed in the water. Under certain conditions, an invert emulsion may be formed wherein water globules are suspended in oil. While an invert emulsion is sometimes desirable for specific application, as in some type drawing operations, it ordinarily is to be avoided. This subject will be covered in more detail under preparation and care of coolants.

The paste type compounds are usually composed of combinations of various soaps, fatty oils, fatty acids, and water. They may contain mineral oils, other emulsifying agents, resins, active chemical additives, germicides, and solid pigment type fillers, all dependent upon the intended application of the coolant. The pastes usually mix well with water to form an emulsified coolant. The free fatty acid content is based on the application requirements.

Because of their constituents, the paste type compounds usually produce emulsions having higher degree of lubricity than the emulsions secured from soluble oils. However, by proper formulation, the latter may be made to possess unusual properties for special applications.

Preparation: Emulsions, whether made from soluble oils or paste type compounds, should be prepared carefully, as the preparation procedure has a great deal to do with

ol and Selection of Coolants for Working Metals

By E. L. H. BASTIAN
Staff Engineer
Shell Oil Co. Inc.,
New York

the ultimate value of the emulsion as a coolant and lubricant. In the case of soluble oil emulsions, the oil should always be added to the water. This initial mix should be agitated thoroughly while the the oil is being added to a quantity of water at least six to seven times the quantity of oil.

After this initial emulsion has been made, additional dilution with water to any desired proportion can be easily made. While for some soluble oils, hot (160° F) water is necessary to secure best emulsions, in most cases cold tap water is entirely satisfactory. If, however, good agitation of the mix is not made while the oil is being added to the water, some of the soap combining with the water may cause a separation of mineral oil which accumulates as a permanent layer on top of the emulsion. If insufficient water is used in the initial mixing, or if the water is added to the oil, an invert emulsion may occur. Such an emulsion is characterized by a thick slimy appearance. While suitable for some drawing applications, invert emulsions are undesirable for most cutting and all grinding uses. In the latter application an invert emulsion would obviously load up the grinding wheel very quickly and cause trouble.

In mixing paste type compounds with water, it is generally desirable to use hot water, and always necessary to employ agitation, either hand paddle, mechanical, or live steam in order to secure a satisfactory mixture. This is particularly important where the coolant is to be used in a circulation system. If not thoroughly mixed, small particles of compound may deposit in system piping upon shutdown of machines. This could cause complete stoppage of a coolant line over a period of time. Where lightly pigmented compounds are used in circulating systems, this is even more important.

Water Conditions: The characteristics of the water used in preparing emulsion coolant have an important bearing on the preparation procedure to

(*Please turn to Page* 117)

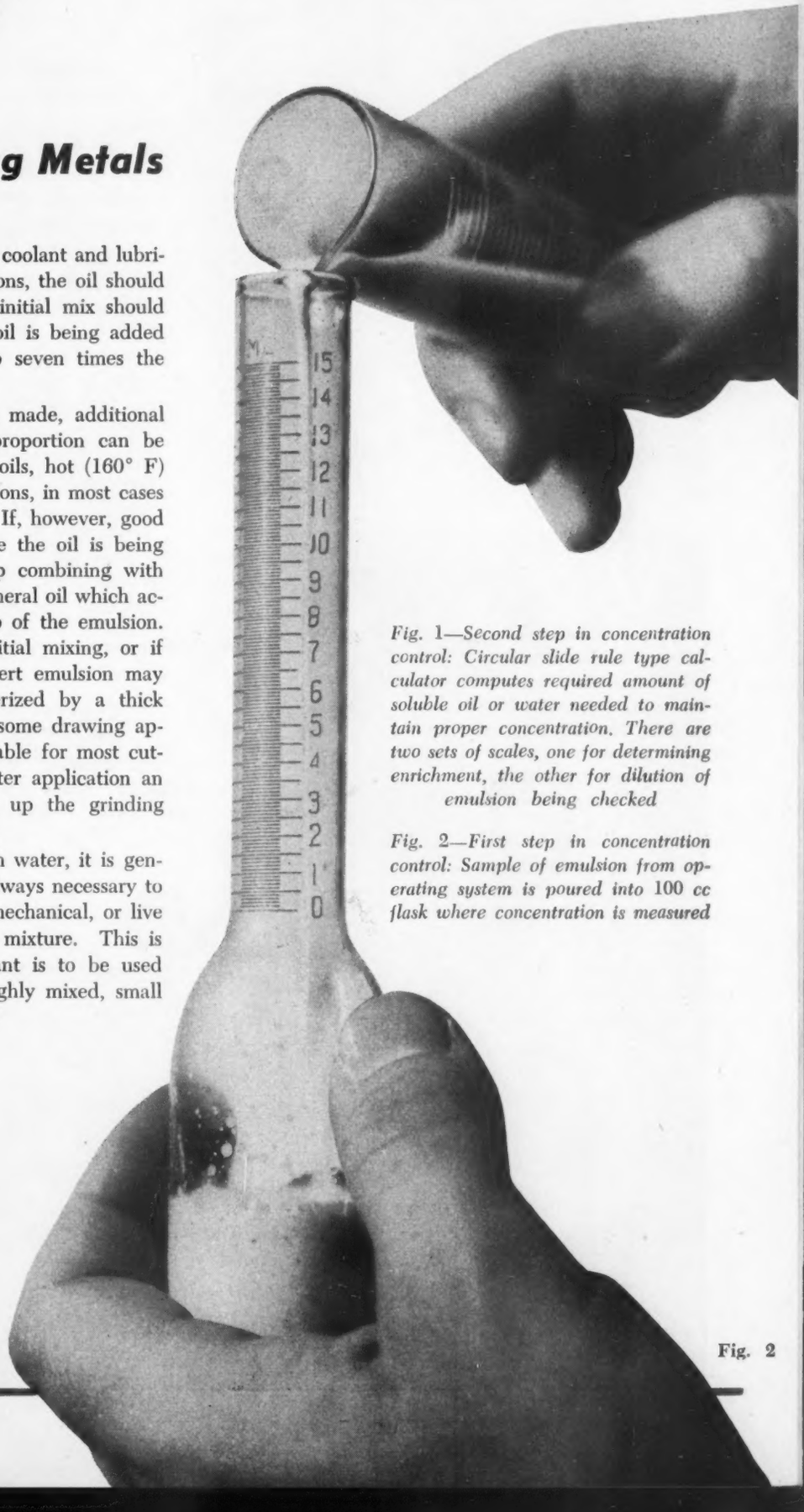
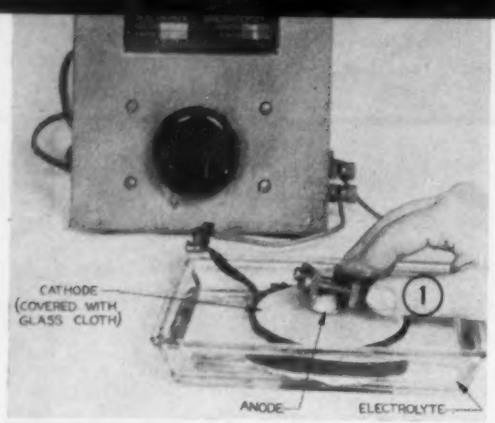


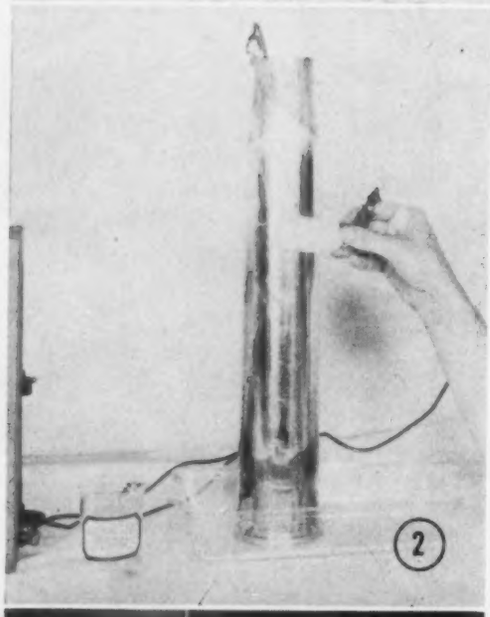
Fig. 1—Second step in concentration control: Circular slide rule type calculator computes required amount of soluble oil or water needed to maintain proper concentration. There are two sets of scales, one for determining enrichment, the other for dilution of emulsion being checked

Fig. 2—First step in concentration control: Sample of emulsion from operating system is poured into 100 cc flask where concentration is measured

Fig. 2

ELECTROLYTIC *Polishing a*





ELECTROLYTIC polishing is a method of producing a lustrous finish on metals by treating them anodically in an electrolyte of suitable composition. Since 1935, when this method was first reported by Jacquet[1] it has rapidly been developed into an important tool of both the metal finisher and the metallographer.

The method has not completely replaced conventional mechanical, or abrasive polishing, nor is it anticipated that it will do so. Rather, it has become a useful complement to mechanical methods in applications where these methods cannot be used for some reason or other.

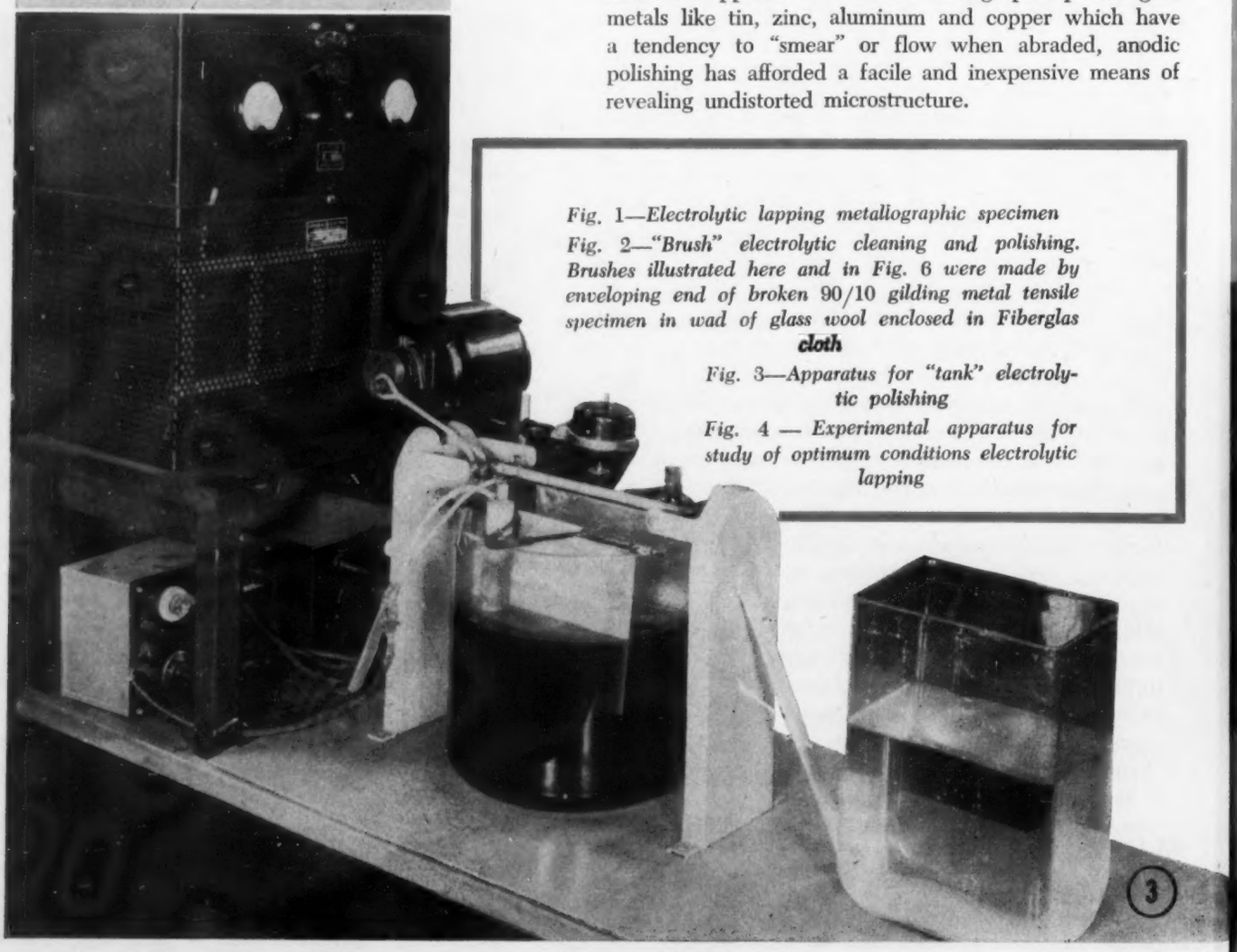
For example, in commercial polishing stainless steels of the high chromium and chromium-nickel types, where low heat conductivity of the alloys and high frictional forces generated by abrasive action cause "burnt" or oxidized areas, electrolytic polishing has found its widest industrial application. In the metallographic polishing of metals like tin, zinc, aluminum and copper which have a tendency to "smear" or flow when abraded, anodic polishing has afforded a facile and inexpensive means of revealing undistorted microstructure.

Fig. 1—Electrolytic lapping metallographic specimen

Fig. 2—"Brush" electrolytic cleaning and polishing. Brushes illustrated here and in Fig. 6 were made by enveloping end of broken 90/10 gilding metal tensile specimen in wad of glass wool enclosed in Fiberglas cloth

Fig. 3—Apparatus for "tank" electrolytic polishing

Fig. 4 — Experimental apparatus for study of optimum conditions electrolytic lapping



By JOSEPH MAZIA

g and Lapping for Mirror Finishes

Two methods outlined here are effective in obtaining fine finishes on many metals and alloys, preferably, but not exclusively, one-phase systems such as alpha brass and austenitic steel. After extensive study at Frankford Arsenal, author recommends systems for rapid results in metallographic work

For electrolytic polishing to be effective, the conditions of the process must be controlled in such a manner that projecting portions of the surface of the metal are dissolved at a greater rate than recessed portions. A plane surface is obtained only when all of the solid phases of the preferentially dissolved areas are removed at the same rate.

Necessity of meeting this last condition imposes the greatest limitation of the process; this is the difficulty experienced in electropolishing multiphase alloy systems and metals containing nonmetallic inclusions. These heterogeneous structures favor preferential attack of one or more of the solid phases of certain types of inclusions and excessive dissolution of metal surrounding insoluble inclusions. This results in the appearance of voids, pits or inclusions in high relief, which cause the metal to look "dirtier" and less dense than it really is.

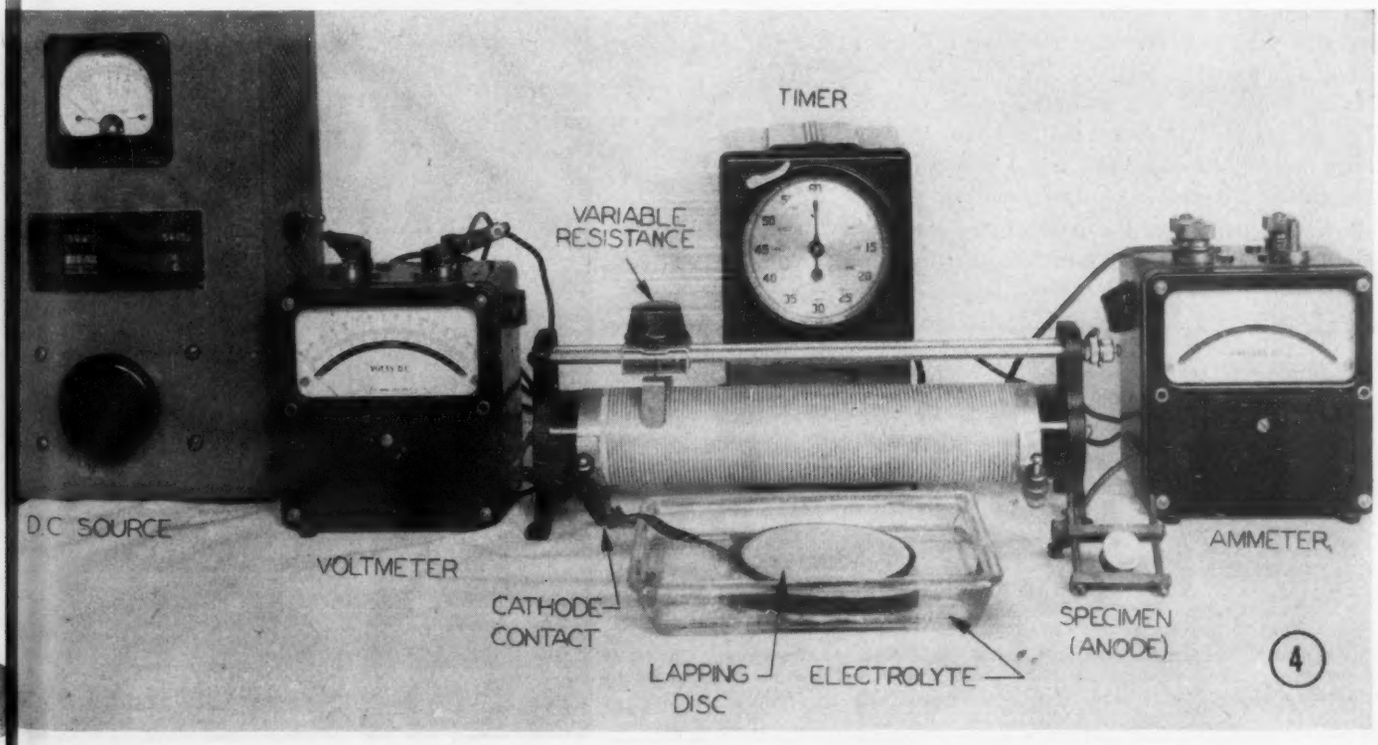
The history of electrolytic polishing is largely one of the developments of suitable electrolytes for intended applications. It also contains many researches into tank and cathode materials, and the critical conditions of surface pretreatment, solution temperature, current density and power requirements.

Most of the reported electrolytes are extremely corrosive and require caution in handling. They contain a large proportion of syrupy acids such as orthophosphoric or sulphuric which tend to cling to the work, thus causing an additional hazard if the "drag-out" is permitted to drip around the apparatus.

Many electrolytes contain varying proportions of acetic anhydride and perchloric acid, stemming from Jacquet's original invention. The solutions are not only obnoxious because of the first mentioned ingredient, but are extremely dangerous because of the second. In contact with any organic material or with bismuth and alloys of bismuth especially when heated, perchloric acid is violently explosive. However, when handled by personnel protected by full knowledge of the dangers involved and the necessary precautions, electrolytic polishing is not more hazardous than most other electrochemical processes.

Tank electrolytic polishing has been in use in this laboratory for a period of about 2 years. The process used is that of Lucius Pitkin Inc., New York, employing an electrolyte containing orthophosphoric and sulphuric acids for polishing brass. Chief use of the process has been in polishing of 70/30 brass small arms cartridge case cups for routine grain size determination.

Fig. 3 shows the tank electropolishing apparatus. As shown in this illustration, a means of mechanical agitation of the work rod is provided in order to avoid streaks, or undulations on the anode surface due to clinging of oxygen gas liberated by electrolysis. Automatic tempera-



ture control is effected by means of an electrical immersion heater controlled by a thermostat which limits the electrical input through a relay system.

The brush method of electrolytic polishing was developed to provide a ready means of polishing discrete areas of heavy and cumbersome objects which were not amenable to either mechanical treatment or to tank electro-polishing. Bulky and massive objects can be polished without large tanks, hoisting equipment, large quantities of obnoxious and expensive solution, conforming cathodes and provision of a means for agitating work.

Selective polishing is effected without benefit of "stop-off" materials, merely by controlling area of work contacted by the polishing brush. Temperature control of the solution is not required for the brush method although it is a critical factor in most applications of tank electropolishing.

Principle of brush polishing was used to develop an "electrolytic lapping" process, so named because it was devised as an alternative to the mechanical polishing of metallographic specimens, the last operations of which are usually the application of fine abrasives by means of rotating laps.

Electrolytic lapping differs from brush electrolytic polishing in that the former involves a moving anode while the latter involves a moving cathode. In both processes the work is made anode and both methods employ a cathode enveloped in a solution-retentive, nonconducting material such as glass cloth or glass wool.

Brush application of electroplating and electrocleaning has been in use for a number of years. However, a search of the patent and general published literature has failed to disclose prior use of this principle for electrolytic polishing.

Brush Electrolytic Polishing: An electrolytic brush is made of a metallic core enveloped in glass wool, glass cloth or any other solution-retentive nonconductor of electricity which will resist the action of the electrolyte. The brushes illustrated in Fig. 2 and 6 were made by enveloping the end of a broken 90/10 gilding metal tensile specimen in a wad of glass wool enclosed in Owens-Corning Fiberglas cloth No. ECC-11-108, made of Pyrex glass thread. Because of the corrosiveness of electropolishing solutions, rubber gloves should be worn by the operator. Gloves were omitted in Figs. 2 and 6 in order to illustrate more clearly the details of the apparatus.

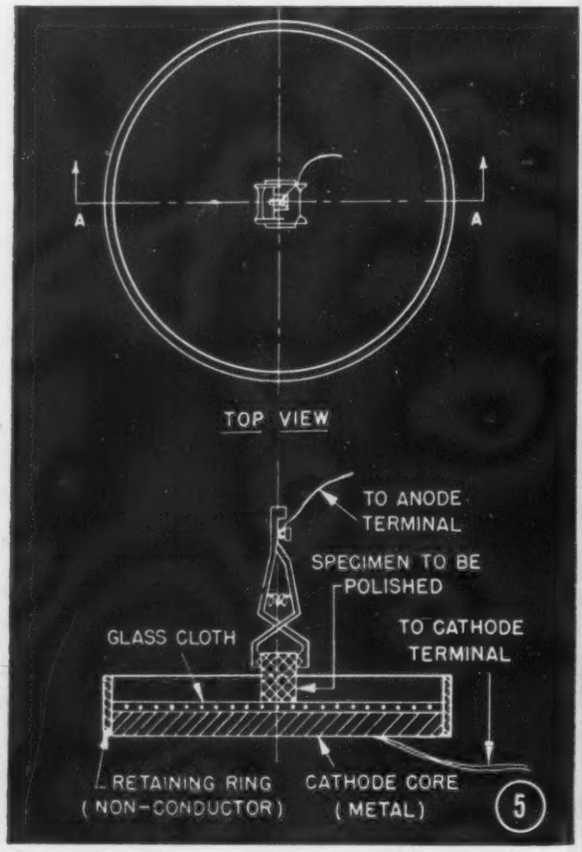
To effect polishing, the core of the brush is made cathode, the brush is moistened by dipping it in a suitable electrolyte, and the work is polarized as anode. A source of direct current at a potential up to 12 v may be used, such as a storage battery, motor generator set or rectifier. In the setup shown in Figs. 2 and 6 the direct current source is a Selectro-plater, which is a stepdown transformer in series with a selenium rectifier, made by W. Green Electric Co., New York.

Proper voltage is applied across the terminals and the brush is moved over the area to be polished. A gentle pressure of the brush is maintained against the work. The proper voltage for polishing a given alloy with a given electrolyte is determined by experiment.

It was found that a potential of from 10 to 12 v was optimum for polishing copper, 90/10 gilding metal, 70/30 brass and 60/40 brass with an electrolyte composed of 95 per cent H_3PO_4 (sp. gr. 1.69) and 5 per cent H_2SO_4 (sp. gr. 1.84). Percentages are by volume. An ammeter placed in the circuit did not yield steady readings owing to rapid changes in the electrolyte resistance due to dissolution of anode metal, release of heat by electrolysis and stirring of the solution by motion of the brush. However, it was determined that the maximum current density, calculated over the area under the brush, was of the order of 10 amp per sq in. (1440 amp per sq ft) when the applied potential was 12 v.

A portion of an aluminum forging made of class 3 alloy, U. S. Federal Specification QQ-A-367b, was brush polished by use of a solution containing 2 parts by volume perchloric acid (sp. gr. 1.48), 7 parts by volume acetic anhydride and a potential of 15 v.

It was found that the brush method, when used exactly as described above for copper-base alloys provides a rapid and efficient means of cleaning and polishing tarnished high brass, Fig. 6. Preliminary degreasing is unnecessary



CONDITIONS FOR ELECTROLYTIC LAPPING OF METALS AND ALLOYS

Material Polished	Electrolyte Composition (Volume %)	Optimum Voltage (Volts)	Duration of Polishing (Seconds)
Copper (cold drawn)	95 H_3PO_4 5 H_2SO_4	8	30
Brass (70/30)	5 H_2SO_4	9-12	25
Brass (60/40)	5 H_2SO_4	9-12	30
Stainless Steel (18-8 type)	80 H_3PO_4 20 H_2SO_4	8	60
Plain Carbon Steel (0.30% C)	80 $(CH_3CO)_2O$ 20 $HClO_4$*	7	90

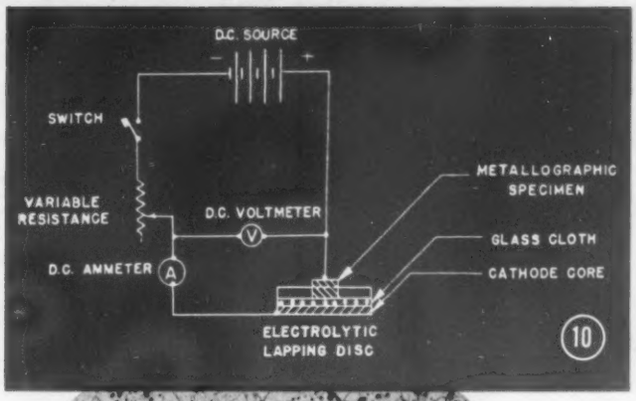
*This is a highly explosive solution and should be handled with great care. Contact of the electrolyte with any organic material or with bismuth and bismuth alloys should be particularly avoided (21).

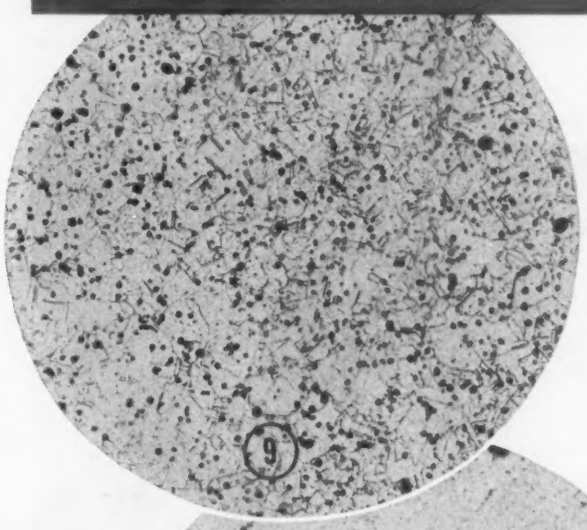
when a phosphoric acid electrolyte is used and when relatively thick layers of grease are not present.

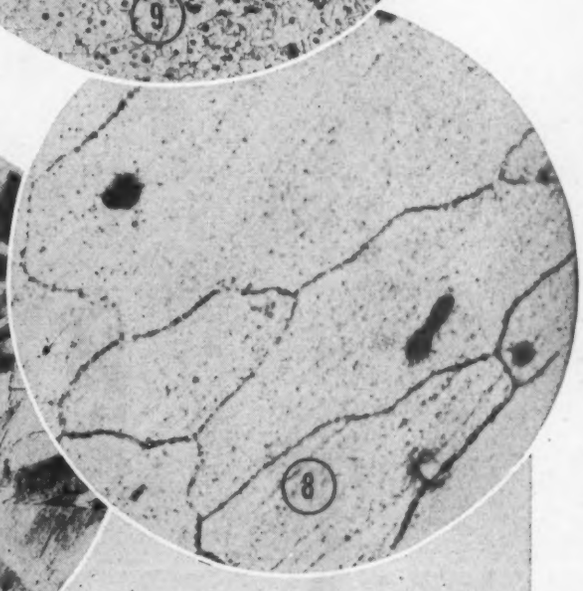
In all of the brush polishing described above, no preliminary cleaning or abrasive polishing was used except in the case of the aluminum alloy which was prepared by polishing with number 1 grit emery paper (Behr-Manning Corp.)

Electrolytic Lapping: A cross-sectional diagram of the electrolytic lapping apparatus is shown in Fig. 5 and photographs of the apparatus in use for metallographic work are shown in Fig. 1. Figs. 4 and 10 illustrate the experimental apparatus used to determine the optimum electrical conditions for polishing various metals and alloys.

As indicated in Fig. 5, the specimen to be polished is the anode and the core of the lapping disk is the cathode in the electrolytic circuit. For the experiments reported herein a 70/30 brass (*Please turn to Page* 126)







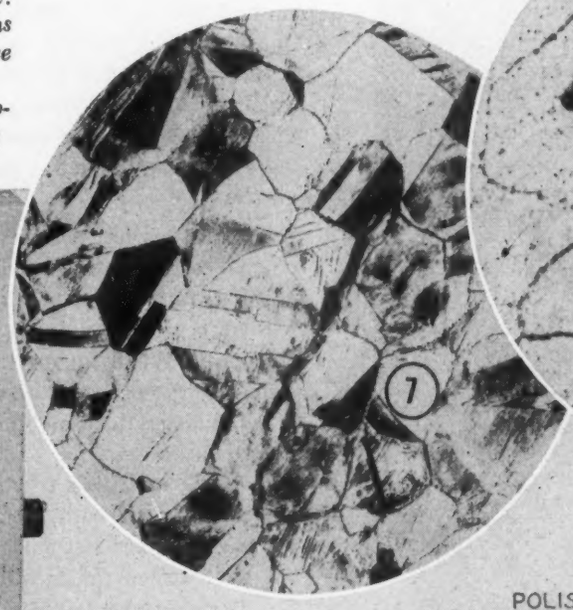


Fig. 5—Cross-sectional diagram of electrolytic lapping apparatus

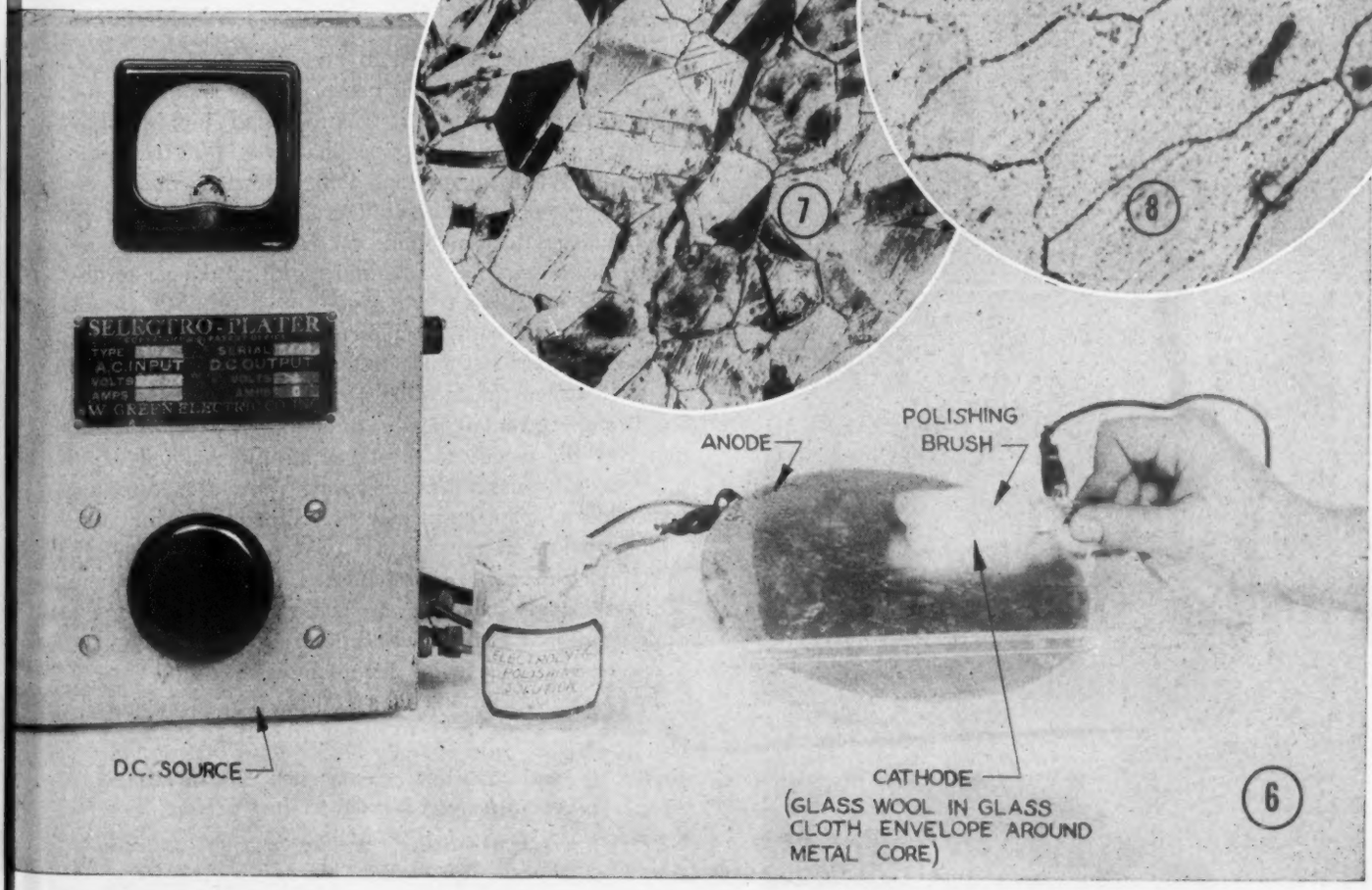
Fig. 6—"Brush" electrolytic polishing of 70/30 brass disk for grain size determination

Fig. 7—"Brush" electrolytically polished and etched 70/30 brass. Etchant: $NH_4OH+H_2O_2$. X75

Fig. 8—"Brush" electrolytically polished and etched aluminum alloy forging Class 3 alloy; specification QQ-A-367b. Etchant: Keller's reagent. X500

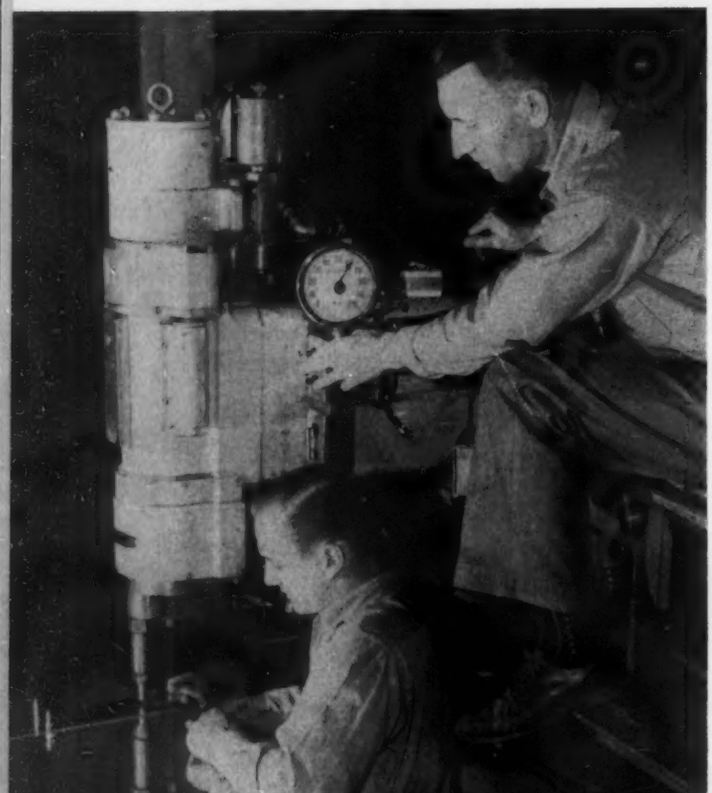
Fig. 9 — Electrolytically lapped and etched (note exaggeration of inclusions) copper rod. Etchant: $NH_4OH+H_2O_2$. All photographs courtesy U. S. Army Ordnance Dept., Frankford Arsenal

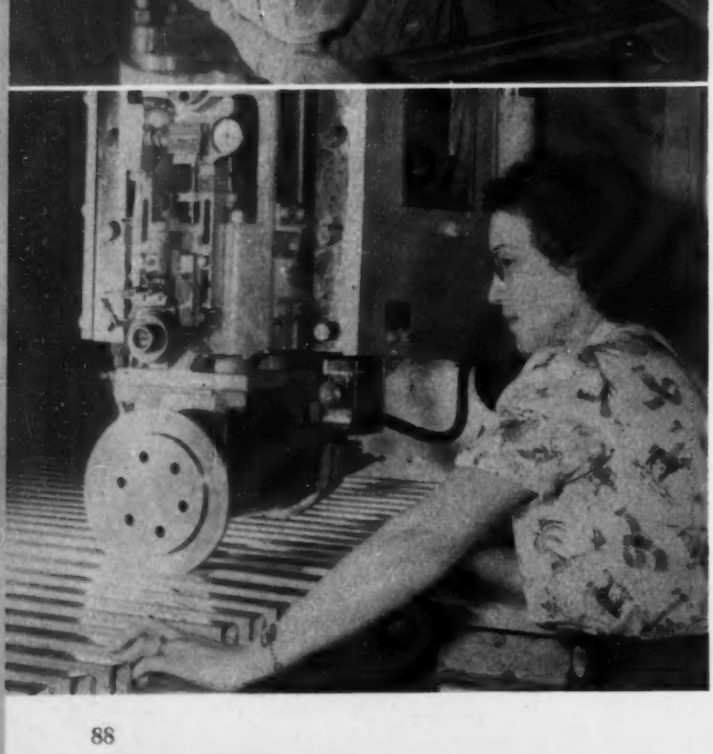
Fig. 10—Wiring diagram of apparatus for electrolytic lapping



Spot Welding OF PRIMARY STRUCTURES

Method Expanded for 67½-Ton Sky Giants





WHILE spot welding is not new to the aircraft industry, Boeing Aircraft Co., Seattle, claims to be the first to use this process extensively in primary structures. The B-17 and B-29 bombers were noted for their traditional stamina, but the types of craft now under production, the 67½-ton Stratocruiser and Stratofreighter, have a greater amount of spot welding than any airplane built by Boeing since 1936 when the company began to make use of the process.

Twenty-eight spot welding machines are currently being used at Boeing. These include three rocker-arm machines; three roll-spot welders; 19 press welders and three portable gun-type welders. Of these, 11 are alternating current machines and 17 of the stored energy type.

The growth of spot welding in Boeing craft involved aerodynamic efficiency, for smooth surfaces offer less resistance, increased speed; structural integrity. Cost and timeliness comprise a third factor. Spot welding as developed in the Boeing plant is amazingly strong. In 0.040-in. aluminum alloy used in body skin lap joints, for instance, a single spot must exceed a shear test of 600 lb. Army-Navy specifications for welds in this gage are only 345 lb.

Rigid and painstaking control of every step is maintained throughout the entire spot welding process. It begins with a bath, in which the parts to be welded are treated in an alkaline degreasing solution. They are then washed, passed through a deoxidizing solution of hydrofluosilicic acid, washed again and then dried in hot air. A buffing treatment is given the mating surfaces of materials which are to form the high-strength joints. All through this cleansing process and from there until welding is accomplished the parts are literally handled with gloves.

Time limits are enforced to prevent the formation of objectionable oxides which occur on any aluminum or alloy surface in open air. Wire-buffed high-strength joints are welded, wherever possible, within 30 min after cleaning. When longer time limits are needed, for assembly purposes, the parts are tacked in place immediately after buffing; the time limit for completion of welding may then be extended to 24 hours with no danger of objectionable oxidation taking place.

Following the bath, samples of each part are given an electrical surface-resistance test. Test sample pieces are placed between the electrodes of a testing machine and a 100 amp current is passed through. A delicate meter indicates the electrical resistance of the residual oxide film on the parts. The cleansing process is carefully controlled to keep the surface resistance of representative samples below 21 microhms.

With clean surfaces established, more samples are taken and single spot welds are made with them under the same conditions as if actual fabrication were taking place. Shear tests are made of these samples.

In failure of the joint it is (*Please turn to Page* 128)

Fig. 1 (*top*)—*Workers exercise great care in aligning parts of body skin panel for spot welding*

Fig. 2 (*bottom*)—*Rollspot welder "stitches" stiffeners with electric "thread"*

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

R. K. LEBLOND IS 84: That's what Joseph Garretson says in his column in the April 23, 1947 issue of the *Cincinnati Enquirer*. I know that many will share my feelings of surprise and admiration. Here, in part, is Mr. Garretson's tribute:

"Mr. LeBlond was born in what then was the village of Linwood on April 23, 1864. After completing lower grade schools, he began his machinist apprenticeship with the Franklin Type Foundry on Vine street. During that period he attended night school at Ohio Mechanics Institute.

"In 1887, when he was 23 years old, he started his own business in a 20 x 20 ft room on Pearl street, between Elm and Plum. Today the LeBlond company is one of the world's great machine tool building establishments. There isn't a machinist's job in that whole plant that 'R. K.' couldn't handle himself.

"Very likely R. K. LeBlond is the only man in this country who can 'shoot his age' on a golf course and who has been able to do so ever since he was 72."

I can testify to the truth of this last statement—and more. Not many months ago I was one of a gallery which literally "trailed" R. K. LeBlond around the golf course at Hot Springs, Va. Having outwalked that gallery, Mr. LeBlond returned to the Homestead, changed into dress clothes and with the hearty co-operation of Mrs. LeBlond, spent the evening outdancing a fresh contingent of people, many of whom had spent the afternoon in rocking chairs on the porch.

And now a final word from Joseph Garretson: "A little more than a year ago, Mr. and Mrs. LeBlond celebrated their golden wedding anniversary. They have four children, 16 grandchildren and three great-grandchildren."

MECHANIZED MEASURING: Some of the highly important—and too little recognized—improvements made in machine tools in the last few years, are in the design, convenience and reliability of built-in measuring devices.

Machine tools from way back had various kinds of divided and graduated dials, thimbles, scales, rods, stop mechanisms, etc. Some were engraved, others were good examples of knurling, still others were masterpieces of hand marking with chisel and numbering stamps. Except in the cases of a few of the toolroom machines, no one paid much attention to them except when roughing.

Just as the influence of various precision instruments, once confined to the inner sanctum of the toolroom, has extended throughout the better production shops, so also has the use of dependable built-in measuring extended to a wide variety of production machines. Devices of this nature once found only on toolroom lathes, now are common on regular engine lathes and turret lathes. Others once found only on "dividing engines" and precision boring machines, now are common on production milling machines and drilling machines. Not only are they common, but also they are being used extensively by operators in gaging finishing cuts. These operators take them for granted and trust their accuracy.

This condition of things introduces one more very important reason why a great many old model machine tools—regardless of how good their physical condition may be—represent a poor investment, regardless of how attractive their price may be. When operators are conditioned through habit to depend upon certain functions in a machine, they are neither efficient nor satisfied when put on a machine lacking those functions.

TRECKER ON DEPRECIATION: With the National Machine Tool Show now a certainty (Dodge-Chicago Plant, Chicago, September 17 through 26, 1947) the related subjects of depreciation and obsolescence most fittingly are inspiring some lively "pamphleteering" on the part of builders of metalworking machinery.

In the April 21, 1947, issue of STEEL, I ran some quotes from "Toulmin on Obsolescence". This week I call your attention to "Sensible Depreciation", published by Kearney & Trecker Corp., Milwaukee 14. This pamphlet carries a simple, sensible exposition—in words and pictures—of economic dangers of blind adherence to arbitrary rules of depreciation set up without consideration of constantly changing factors which affect actual obsolescence.

One feature is the sad story of what long term depreciation, without consideration of machine tool obsolescence, did to the once-prosperous metal-working organization known as "Corporation X".

To make a short story still shorter, "Corporation X" wound up its career with a "For Sale" sign on the once well-kept lawn in front of the office. Why did this happen? It happened because there was basic difference in thinking within the organization.

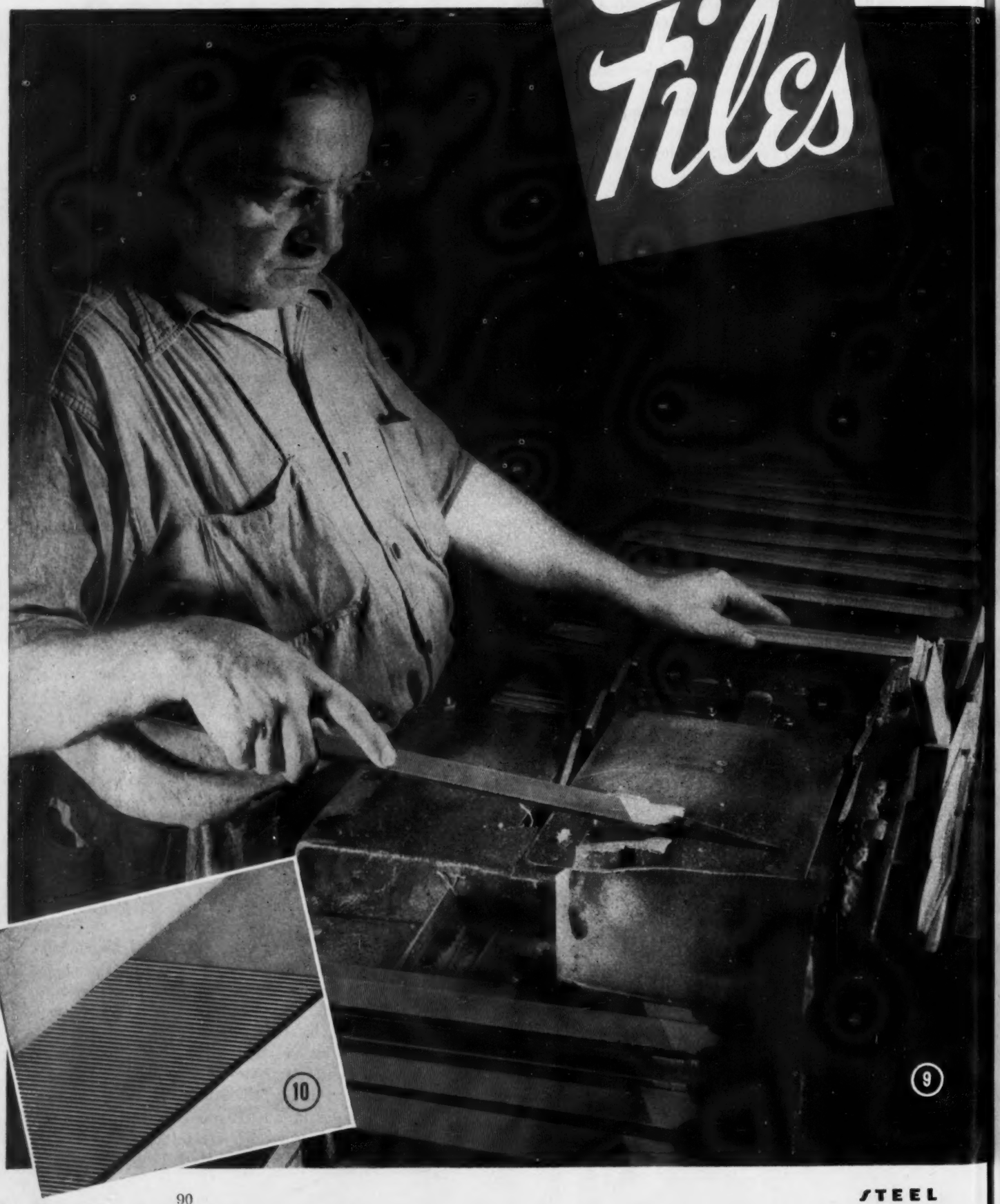
Operating men thought "—in terms of obsolescence. Their prime aim was plant efficiency in terms of wage rates and output per manhour. Increasing the productivity of personnel was their major goal. Rising production costs, to the operating men, suggested the spectre of declining productivity of the plant, inefficient use of manpower."

Financial men thought "—in terms of depreciation rather than obsolescence. They didn't know whether a particular machine was obsolete, but they did know the annual recovery rate of the purchase price of that machine. And they considered this factor, not in terms of performance of the machine, but in terms of the overall current financial picture of the company."

Well, as Joe Trecker would say, "Let's stop talking to ourselves" about this pamphlet. Let's get copies into the hands of those in the saddle who do not realize that today "——a man's productivity no longer is measured by the hours and minutes he works, but rather by the capacity and efficiency of the machine he operates."

Manufacture, Selection and Use Of

Files



With literally thousands of files available for thousands of special purposes, selection of the right tool for the job is an exacting requirement for lower-cost production. Here are some of the files from which the user can choose; speeds, wear and cost that can be expected, and filing techniques generally used for best results

By L. E. BROWNE
Associate Editor, STEEL

PRIMARILY, the steel file is a hand tool. Despite great utilization of power by industry, man's muscle and brain still propel, guide and furnish the pressure for bulk of filing applications. Use of the file and filing principles in conjunction with power-operated machines have not been neglected, however. Power filing has and is contributing substantially to the technique of metal cutting and surfacing.

Hand-cut rotary files and ground solid burs, many of the latter now being made of cemented carbide or high speed steel, have increasingly broad applications in metal-working, including die sinking, mold finishing, metal pattern making and tool making. Elongation of holes and slots, removal of burs and fins, breaking and chamfering corners are but a few power filing operations, especially adaptable for hard-to-reach surfaces.

Many styles and shapes are available in both rotary files and ground burs and the right selection in either or both is of basic importance. Tree shapes in burs are used widely by aviation and other industries. Tapered or blunt points and oval shapes are also popular. Other shapes include ball, cone, cylindrical and inverted cone with numerous variations and sizes, thus giving the power filer a wide range of choice, depending on the surface to be reached.

Rotary files are power tools used with stationary or flexible shaft machines, portable air or electric tools, with teeth or flutes cut or ground on the surface. As between a rotary file and ground bur, the choice depends on type of work, preference of the user and at least rough knowledge as to characteristics and differences in production as related to cutting and finishing. As between hand-cut and ground, each of high speed steel, methods of forming the tooth are reflected in the resultant finished work.

Each tooth is cut or formed individually on hand-cut rotary files by an expert with hammer and chisel. This truly is a job for a specialist. Although he may have a blueprint, the handcutter depends on his ability to hold his chisel at the right angle and strike with correct force. In contrast to unbroken flues of ground burs, rotary file teeth are broken up more and are more suitable for tough and dense metals.

Heat is dissipated more rapidly in most cases and this type of power file is satisfactory for tough die steels, electric or gas welds, steel forgings and other scaly and tough metal surfaces.

Cut with a series of unbroken flutes, ground burs have basic flutes extending full length of the cutting head, from base to nose; at designated points, intermediate flutes cut into the basic flute, but are not full length. There are other designs for ground burs by which all flutes are ground or milled to a common meeting point.

Flutes are cut by grinding wheels, operated freehand or by precision machine grinding. Accuracy of tooth shape and equal height around the periphery—the latter eliminating jumping, vibration and uneven wear—are common goals. If machine-cut, each bur is actuated by a master bur for uniformity in shape and size regardless of the number produced.

Ground bur teeth free readily of chips. The ductility of some metals in the nonferrous group, including aluminum, brass, bronze and magnesium, makes this type of power file an efficient performer.

Speeds, Wear and Costs: Cemented carbides have influenced power filing as they have other metal-cutting and forming operations. At same speeds, carbide and high-speed tool steel burs remove about the same amount of metal, but when operated at their most efficient speeds, carbide burs remove up to 400 per cent more stock, completing a job in much less time.

Carbide burs cost nearly 15 times more than high-speed steel burs, but in some corresponding shapes and sizes last 75 to 100 times longer.

Assuming a 75-15 ratio between the two as average, the ratio is still five-to-one in favor of cemented carbide. Burs of this type, with equally good results, also are used on both hard and soft metals. Change-over costs are lower due to flutes retaining maximum cutting efficiency longer. When used on electric and air tools, carbide burs should cut freely; too much pressure may cause vibration tending to crumble cutting edges.

TABLE II

APPROXIMATE SPEEDS FOR MEDIUM FILES AND BURS, GENERAL APPLICATIONS

Dia. of Bur-File	Steel	Aluminum, Brass and Soft Bronze	Magnesium
⅛"	4000 R.P.M.	14500 R.P.M.	16000 R.P.M.
¼"	3200 R.P.M.	11500 R.P.M.	13000 R.P.M.
⅜"	2600 R.P.M.	9000 R.P.M.	10500 R.P.M.
½"	2100 R.P.M.	7000 R.P.M.	8500 R.P.M.
⅝"	1700 R.P.M.	5500 R.P.M.	7000 R.P.M.
¾"	1350 R.P.M.	4250 R.P.M.	5250 R.P.M.
⅞"	1100 R.P.M.	3250 R.P.M.	4250 R.P.M.
1"	900 R.P.M.	2500 R.P.M.	3500 R.P.M.
1⅛"	800 R.P.M.	2000 R.P.M.	3000 R.P.M.
1¼"	750 R.P.M.	1750 R.P.M.	2750 R.P.M.

TABLE III

RECOMMENDED SPEEDS FOR CEMENTED CARBIDE BURS

⅛" diameter	25000 R.P.M.
¼" diameter	20500 R.P.M.
⅜" diameter	16500 R.P.M.
½" diameter	13000 R.P.M.
⅝" diameter	10000 R.P.M.
¾" diameter	7500 R.P.M.
⅞" diameter	5750 R.P.M.
1" diameter	4750 R.P.M.
1⅛" diameter	4000 R.P.M.
1¼" diameter	3500 R.P.M.

Under certain conditions speeds up to three times as much as the above might be advisable.

Fig. 9 — Ringing file for soundness. Proper ring indicates proper heating

Fig. 10 — Long angle lathe file

PRECISION CASTINGS: Small precision castings such as these, in wide range of design and in any castable alloy to tolerances as close as 0.002-in. are produced by centrifugal and vacuum methods at Precise Castings Corp., division of Cooper Alloy Foundry Co., Hillside, N. J. Sample pieces and even entire production lots are checked for surface imperfections by Zyglo ultraviolet light process; internal defects are detected by x-ray examination. The company's facilities were greatly expanded by the recent consolidation of Aro-Cast Corp. and Precise Castings Corp.

Approximate recommended speeds for carbide burs and rotary files and burs for general applications in accompanying tables, compiled by Nicholson File Co., Providence, R. I., reveal the high-speed advantages of carbide tools.

Highest rockwell hardness, consistent with required toughness, is maintained in cemented carbide burs for filing. Combining hardness and toughness to high degree, carbide burs because of brittleness will not resist abuse in handling. To avoid damage to their cutting edges, tungsten carbide burs should never be tossed around on a bench or in a tool box. Due to their higher costs, savings are reduced in high ratio when these tools are damaged.

Cutting ends of power filing tools—their heads or cut sections come in a variety of shapes, including cylindrical, tree-shapes, ball and inverted cones. Length usually refers to cut section, or head. The tip is called the point or nose, depending on whether it is pointed or rounded. Head section, from which the shank extends, is called the base or heel.

Depending on amount of stock to be removed and finish required, teeth or flutes of these tools are cut or ground in three degrees of cutting pattern: (C) Coarse, (M) medium, and (F) fine. For heavy and medium power filing shanks are generally ¼-in. in diameter, but for relatively delicate work, the tool, file or bur, is usually designed with a ⅛-in. shank. Although in general physical characteristics are much the same, rake and degree of coarseness of teeth on cemented carbide burs are frequently changed to conform with peculiarities of the material. Negative rake, rather than radial, produces a structure of greater strength.

Operating speeds in power filing vary with the skill and technique of the operator, type of power employed, amount of material to be removed, finish desired, and numerous other variables. Speed therefore is a flexible issue; higher or lower speeds than normal affect finish and stock removal. The Nicholson tables for computing speeds, Tables II and III, give them in revolutions per minute rather than in surface feet per minute for convenience. Any table of speeds should specify diameter of file or bur to be used at recommended speeds, surface feet per minute being the basis of calculation. Flexible shaft machines have a limited number of speeds, governing to considerable extent the possible revolutions per minute. Experience best determines what speeds will give most satisfactory results for a particular job.

Broadly speaking, hand-cut rotary files are used principally on ferrous metals, high speed ground burs on nonferrous metals, and cemented carbide burs on either. Assuming that speeds are reasonably well selected, efficiency of rotary files and burs differs little between applications in electric and air tools. Choice is frequently dictated by existing plant equipment. Power filing tools should be operated at an even feed rate and uniform cutting pressure to avoid uneven surface finish.

As to speeds, the smaller the bur, the higher the speed. At the start, a new bur should be used at moderate speed, this gradually being stepped up as "the new wears off." File and bur teeth should at all times be kept sharp. For accurate control, a short grip on the shank is best. Resort to longer grip for hard-to-reach surfaces. For most work, medium-cut files and burs give sufficient stock removal and satisfactory finish, but for special work, coarse and fine cuts are used for results indicated by the nature of the cut.

Selecting the Right File: Kinds, cuts and sizes of files literally run into the thousands, these being mostly in the hand operated category. Selection of the right file for any one of thousands of different filing jobs is of basic importance. Any file performs more correctly and usually faster on the metal or other material for which it was designed. The wrong tool therefore will fail to do an efficient job and actually may damage or ruin the file and the work. Choice of the correct file makes possible a greater number of efficient filing strokes per file and therefore per "file dollar." In general, different files are required for (1) flat or convex surfaces; (2) curved or convex; (3) filing an edge; and (4) filing a notch, slot and holes, square or rounded.

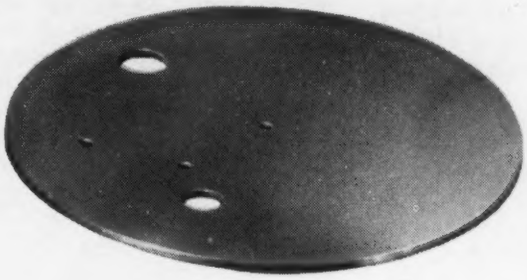
Other filing factors to be considered include: (1) Kind of metal to be filed; (2) kind, shape and hardness of object or part; (3) location, size, and character of the surface, edge, slot, notch or hole; (4) amount of metal to be removed and time required; (5) smoothness and accuracy of finish required. These factors all have a bearing on kind, size and cut of the file. Possible combinations of all these factors and selection of the right file is an exacting task.

After correct selection of a file has been made, proper use of the tool is necessary for most efficient results. Be it file, hammer, chisel, plane or saw, there is a right and wrong way to use each. Skill of a mechanic is reflected by the way he handles any of these simple, fundamental tools. Depending on type of work, working conditions and results sought, the individual "touch" is manifest in use of hand tools. This is especially true in case of files. Pressure, grip and stroke must be varied to suit the job and kind of file.

Broadly, there are three elemental filing actions, bearing in mind that all files—a few machine-operated units excepted—are designed to cut on the forward stroke. These actions are: (1) Straight filing or pushing the file lengthwise, straight ahead or slightly diagonally across the work; (2) drawfiling, grasping the file at each end and pushing and drawing across the piece; and

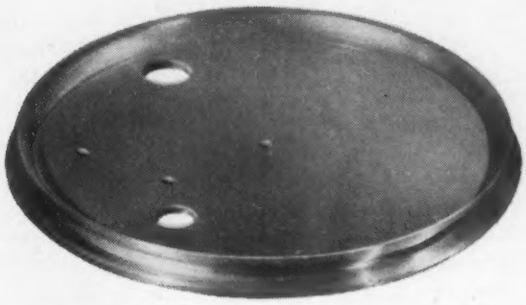
(*Please turn to Page* 130)

UNUSUAL METHOD OF FLANGE FORMATION



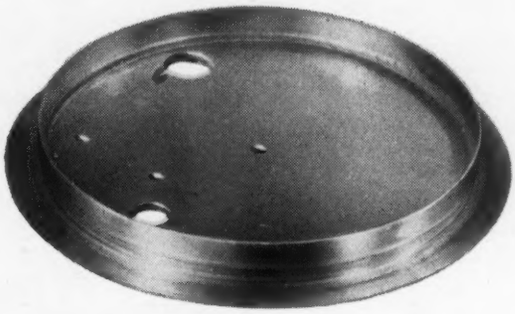
Step 1.

Discs are cut from brass squares, and holes punched for the fittings.



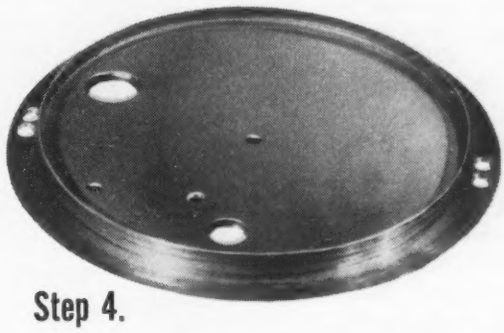
Step 2.

A slot is machined in the edge of the disc. Cutting tool is so designed that it deforms the metal on one side of the slot.



Step 3.

The deformed edge is rolled up to an angle of 90° with the disc.



Step 4.

The flange is machined down to the proper height, which automatically removes the slight puckers that appeared on the edge during the previous operation. Top is subsequently polished and nickel plated.

...A CASE HISTORY BY REVERE

THIS interesting method of producing an integral flange was originated by the Empire Milking Machine Co., West Chester, Pa. The part is a top for its milking machine pail... Revere takes pride in its collaboration on the project. The combination of cutting and deformation required special qualities in the metal; Revere recommended Cartridge Brass, Alloy No. 161, and specified the temper. The proper tool angles were worked out with the customer, and the third operation was changed from spinning to rolling. Thus rejects were reduced to practically zero, and manufacturing time and costs were lessened . . . If you have a problem in metal selection and fabrication, Revere will gladly place it in the hands of its Technical Advisory Service.

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Engineering News *at a Glance*

ELIMINATES MOLDING VARIABLES: Variables created by manual interruptions in conventional methods of plastics molding are eliminated completely by the new automatic machine designed recently by Rockford Machine Tool Co., Rockford, Ill. It performs in one operation, the conventional, slow 3-stage production sequence usually carried out on separate machines. The company reports the machine's 7-step cycle is entirely automatic from feed of the plastic powder to removal of the finished part from the mold.

NEW GRINDING FIELD: Application of mass surface-grinding precision methods of metalworking on glass, quartz, ceramics, sapphires, etc., gives a whole new outlook to these fields. Blanchard Machine Co., Cambridge, Mass., points out that rough grinding of Plano lenses is now being done successfully by surface grinding. Thirty-seven of these, 35 mm in diameter, are machine ground simultaneously. Two minutes of grinding time removes 1.5 mm of glass from each of 37 lenses and produces a surface that is flat to the edges with no chipping.

TOUGH NYLON CABLE: In testing the Nylon cable it currently is producing, Danielson Mfg. Co., Danielson, Conn., found that the "rope" withstands some 320,000 flexings before the steel core breaks, and about 410,000 flexings before the Nylon severs. The test, which involved 1-in. pulleys and guides—such as found in boat riggings—also revealed that no wear takes place where the cable passes through the guides. Besides having a silky appearance, the cable is highly resistant to oils, acids, moisture, salt water, and fire. At present the company is making the cable in two sizes, both employing a 3/32-in. aero steel wire rope core of 920-lb break test.

MINIATURE ROLLING MILL: Watchmakers' version of a rolling mill is now rolling Hiperco for experimental use at the Westinghouse research lab in Pittsburgh. The miniature Sendzimir precision cold strip mill stands less than the height of a man and is about as wide as an office desk. Each part of its balanced roll mechanism is ground to an accuracy of one ten thousandths of an inch to assure precision in rolling metal to one-half thousandth of an inch thick. The two rolls that do the work measure less than ½-in. diameter. In operation, a 100-ft length of metal 1/40-in. thick is fed into the mill at speeds up to 200 ft per min. Material being worked is wound on 12-in. reels on each side of the working rolls, and is passed back and forth seven times before it reaches the desired thickness. The mill was designed for Westinghouse by Armzen Co. of Middletown, O.

"KNEE-ACTION" SHOES: British women, young and old, soon will be walking with a "spring" in every step. At the first postwar British Industries Fair, held simultaneously in London and Birmingham, during the early part of May, a woman's shoe of "revolutionary" design was shown which included a tubular steel spring heel. The innovation is said to widen the scope of shoe designing since the steel heel can be fitted to any type of leather or fabric model.

ANTI-FOULING PAINT: Flying boats now can anchor for long periods without being fouled with marine organisms after being treated with a special thin lightweight paint developed at the Naval Research Laboratory, Washington. Consisting of calomel and copper resinate dispersed in a nonoxidizing matrix, the anti-fouling coating has the normal working characteristics of a good enamel and provides successful protection for periods up to 6 months. Anti-fouling paints used for surface vessels are too heavy for aircraft.

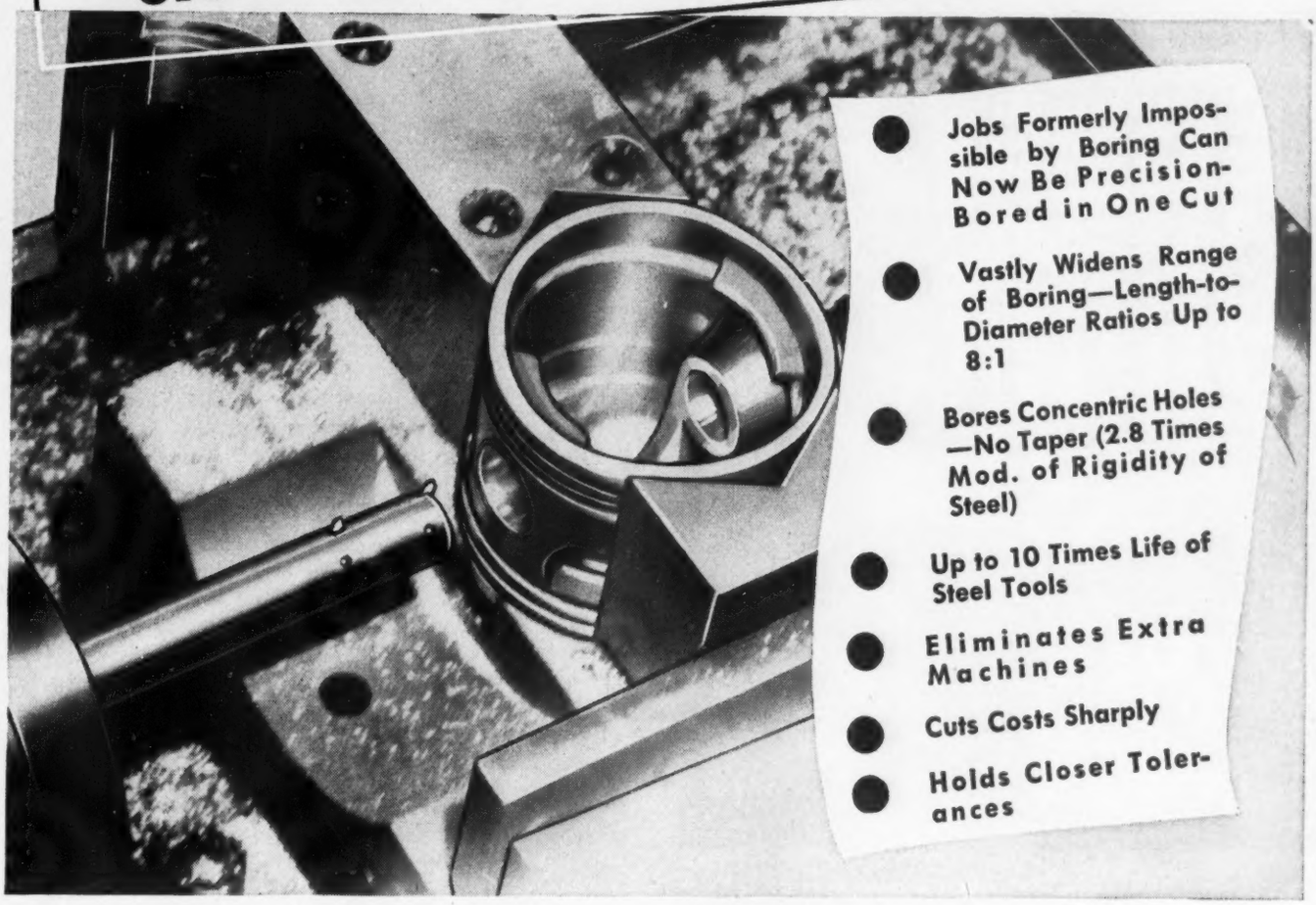
FASTENER TO SHELF SUPPORT: Blind fastener turned out by Simmons Fastener Corp., now is being used as a one-piece shelf support by a refrigerator manufacturer, according to the Albany, N. Y. concern. To receive the shelf, the Spring-Lock fastener is made in form of a hook. Thus, with its blind fastener feature the "hook" can be assembled in the inner lining of the refrigerator when the latter is completely assembled. Besides providing a vibrationless installation, the fastener is locked or unlocked with a quarter turn. It can be installed permanently by merely changing the shape of the installation hole.

CYLINDER FUEL INJECTION: Reduction in fuel consumption, mechanical adaptability to the use of inferior fuel and increased safety through elimination of carburetor icing and back-firing were principle reasons the Germans concentrated on direct-fuel injection of airplane engine cylinders instead of carburetor injection, the Office of Technical Services, Washington, reports. Besides the added weight factor, fuel injection systems have the disadvantage of complexity and higher cost in manufacture and maintenance. For example, the fuel injection system for a 12-cylinder Junkers engine has 1576 parts of which 327 are different. All of these must be expertly made and carefully fitted together. Despite these disadvantages, the Germans were so thoroughly convinced of the benefits that all their craft were equipped with injection systems. German reports indicate savings of 10 to 15 per cent in fuel by means of direct-cylinder fuel injection.

FLYING TEST STAND: Modified B-29 Superfortress is being used by General Electric Co. at its Schenectady, N. Y. flying field to test the company's TG-180 gas turbine, power plant of the newest Army and Navy jet-propelled aircraft. The jet power plants are installed as an auxiliary unit of the huge plane instead of a substitute engine. G-E engineers state the flying laboratory makes a safe and expedient way of conducting tests under altitude conditions, being more economical than establishing altitude wind tunnels. In addition, it allows flight space for design engineers to observe operations under flight conditions, acquainting them with problems attendant with flying.

TOUGH SWISS SOLDER: New era in the aluminum product field may be opened through use of Alsoco, a new aluminum solder from Switzerland, according to Alsoco Corp., New York, which manufactures and distributes the development exclusively in this country. Tests proved that the product, which was used to solder aluminum to aluminum without a flux or flux substitute, resisted shearing after a 250-hour salt spray corrosion test, even though the aluminum base metal itself broke. Other tests on the metallic and electrical properties of the solder showed it will have an important role in the aluminum wire field. When an aluminum wire was soldered to a standard copper lug, resistance was about 20 microhms; however, after the 250-hour salt spray test, the average increase in resistance was only 8 microhms. Toughness of the product was shown during vibration tests conducted on ¼ and ⅜-in. stranded aluminum cable soldered to standard copper lugs. Although the ¼-in. cable broke after 44,000 cycles over a 0.040-in. amplitude at a frequency of 2450 cps, and the ⅜-in. cable broke under similar conditions after 1,487,000 cycles, at no time during the tests did the solder itself fail.

New BORING BAR OF SOLID CARBOLOY GIVES YOU THESE 7 ADVANTAGES: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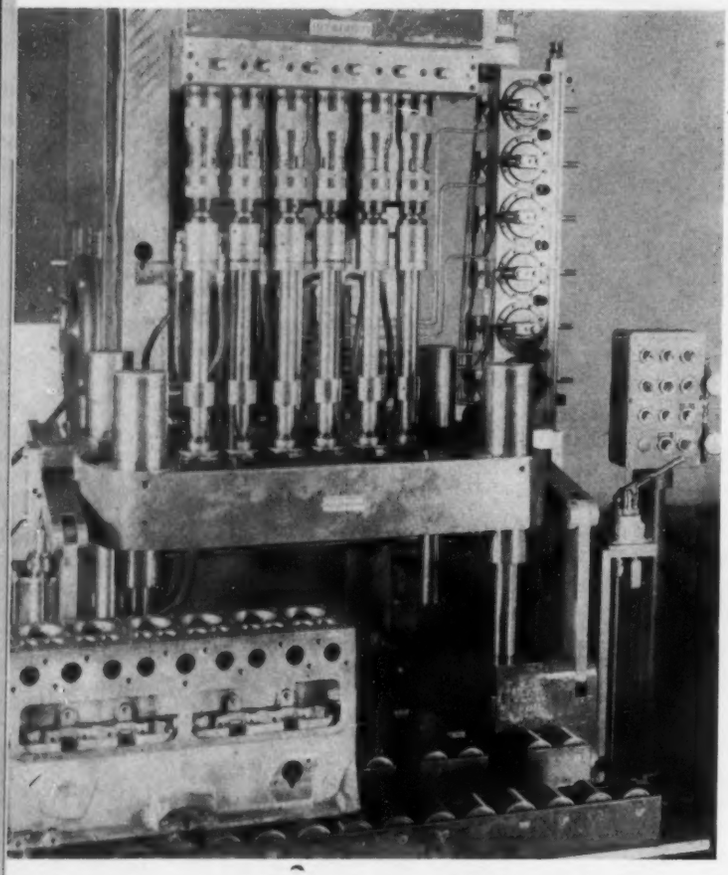

Fig. 1 (left)— Honing machine equipped with 6-spindle head, tools and fixtures. Equipment was developed especially to handle cylinder blocks

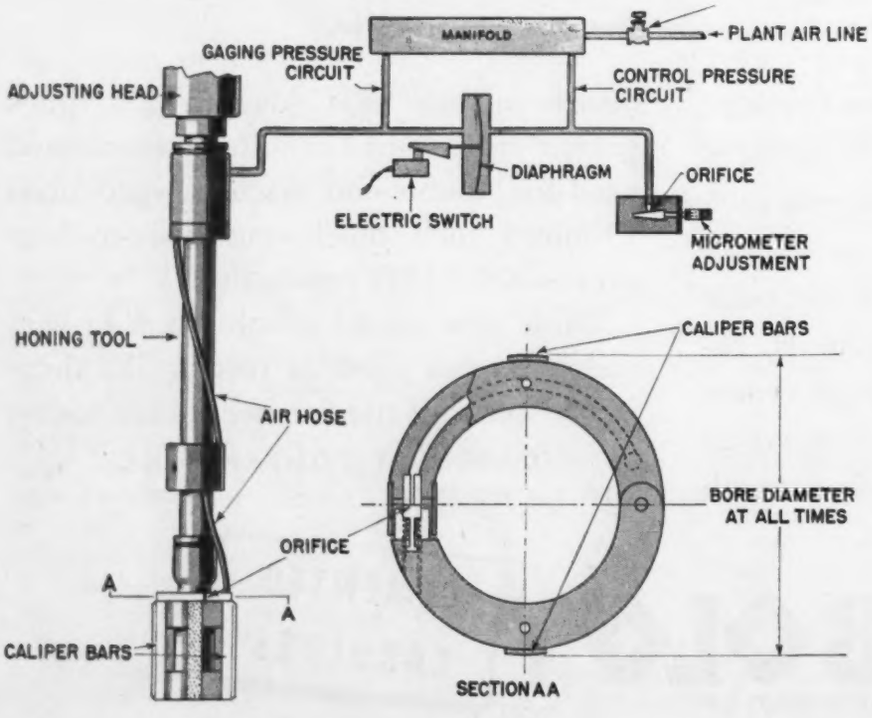

Fig. 2 (below) — "Hydrosize" honing device is expanded at a controlled rate by a hydraulic cylinder. Air gage built into honing tool gives automatic size control

TO eliminate or materially reduce selective fitting of pistons in automotive bores, Micromatic Hone Corp., Detroit, has developed a honing tool and head which automatically controls the finished bore size. Fig. 1 shows a honing machine built by Barnes Drill Co., Rockford, Ill., equipped with a 6-spindle head, tools and fixtures. In a honing cycle of 30 sec, this equipment removes an average of 0.004-in. stock from each of the six bores, corrects out-of-roundness and taper, and holds bore-to-bore size within a limit of 0.0005-in.

Operator loads the block into the fixture and presses the button to start the honing cycle. Feed-out of the tool, the collapsing and withdrawal of the tool and the compensation for abrasive wear are entirely automatic.

It is standard practice, in production automobile plants, to manufacture and stock pistons in a range of sizes. As the blocks come to the assembly line, each cylinder is gaged and a piston selected to fit it. Since the fit of the piston must be kept within a close tolerance, the greater the variation in bore sizes, the more piston sizes must be stocked.

Cylinder Bores Uniform in Size

Honing being the last operation on the cylinder bore, Micromatic Hone engineers worked for several years to develop a means of keeping the cylinder bores to a uniform size. This work has resulted in a new order of thinking in relation to control of bore size and accuracy, within close tolerances. Two developments have made it possible to maintain this accuracy in production operations:

1. Controlled positive feed-out of the tool: The tool is expanded at a controlled rate by a hydraulic cylinder. This positive expansion may be adjusted so the high spots are honed before any stock is removed from the large parts of the bore. This results in the bore being straightened and made round with a minimum heat and distortion.

2. Automatic size control: An air gage is built into the honing tool. The pressure in the gage drops in proportion to the stock removed from the bore. When the pressure drops to a predetermined point, because the bore has been honed out to the desired size, the honing cycle is completed automatically.

Known as "hydrosize," the device operates as follows, schematic representation being shown in Fig. 2: Air is taken from the plant air line. The pressure is reduced to approximately 6 psi. This air supply is directed through venturi fittings into two circuits which are independent of each other except that any variation in the air supply will affect them both equally. The pressure in each one is

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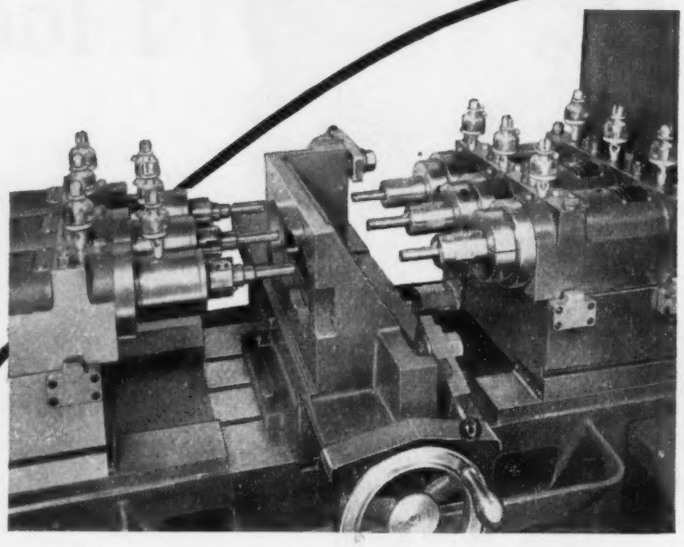
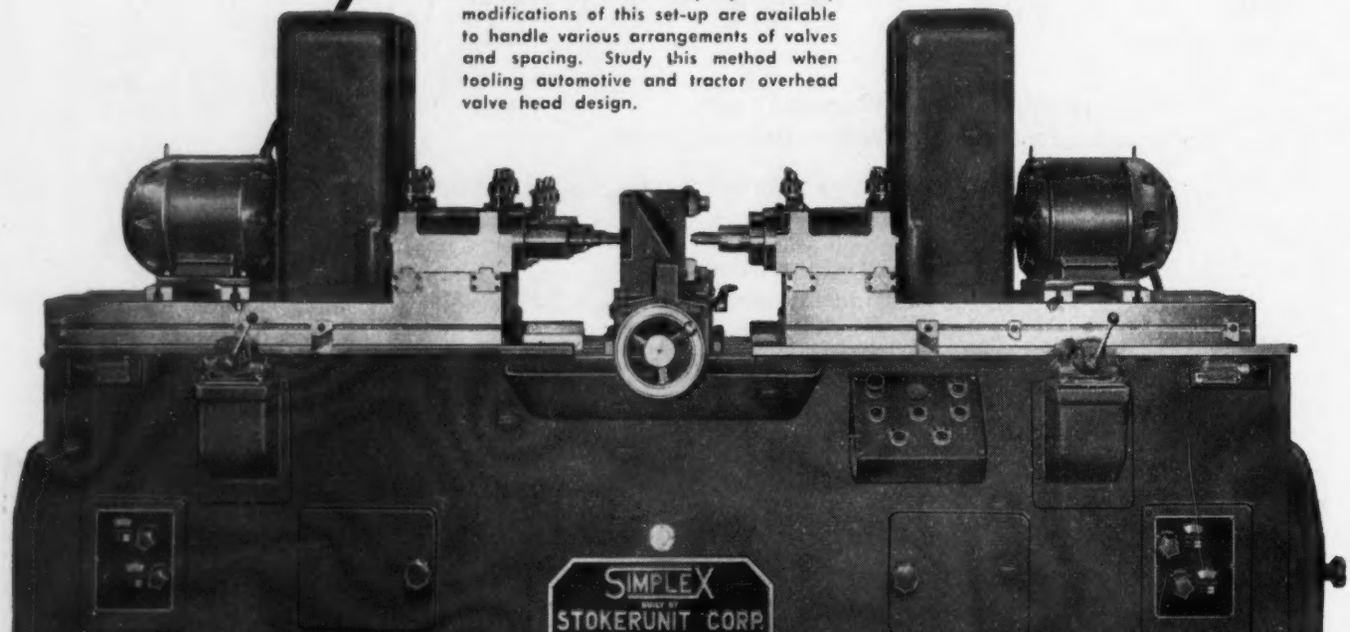
SIMPLEX

The life and efficiency of a gasoline engine depends much upon the accuracy of valves and valve guides. One progressive manufacturer found that by placing the cylinder heads for an overhead valve engine in a simple cross-sliding fixture, semi-finish boring one side and precision boring the valve guides and valve seats from the other, he achieved the finest precision and engine performance.



This SIMPLEX 2U 2-way Precision Boring Machine, with three #1 spindles on each side and cross-sliding fixture, bores two intake and two exhaust valve guides and seats in a four step cycle. Many modifications of this set-up are available to handle various arrangements of valves and spacing. Study this method when tooling automotive and tractor overhead valve head design.



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PACKAGING EXPERT

. . . helps railroad reduce freight losses

AFTER a year of trial, Union Pacific Railroad recently termed "highly successful" one of the most recent innovations in carrier operation—utilization of the services of a container engineer. Believed to be the first railroad to add a packaging expert to its loss and damage prevention organization, Union Pacific hired a specialist in an additional effort toward counteracting the ever-increasing burden of freight loss and damage payments—payments which in the United States in 1946 totaled in the neighborhood of $80 to $100 million.

Course of action taken by the container engineer is direct and simple, methodical. First step is investigation. Instances of container failure are brought to the attention of the company's freight claim department from observation of freight at various points.

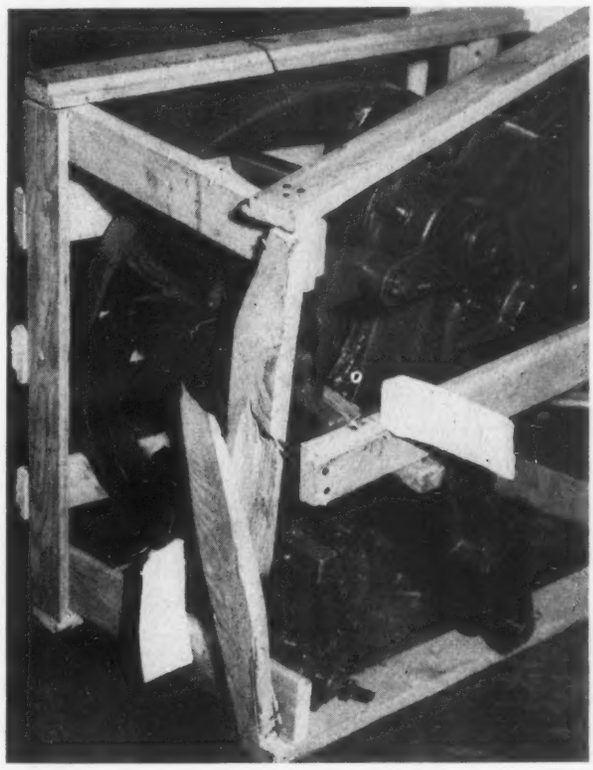
Much of the observation is personal on the part of the container engineer. However, the railroad has also noted an increase in efficiency on the part of its local freight inspectors and freight service inspectors as a result of working with the container engineer.

Next comes analysis of failures. This is the technical high point of the company's damage prevention effort and the nucleus of its success. With the container flaw uncovered, the engineer prepares a report for the company's general freight claim agent. In many instances the reports are accompanied by drawings or photographs to illustrate a point more clearly.

Based on the reports, letters are written to the party or parties concerned. These may be the shipper, the receiver, or the manufacturer if other than the shipper. The letter informs of the damage, describes what occurred, states the analysis of the trouble, and suggests what corrective measures may be taken. A personal visit by the engineer played a large part in the successful action taken in particularly serious damage cases.

One instance involved three cars of water heaters shipped by a west coast concern to a distributor in a city nearly a thousand miles away. When the heaters arrived they were so badly damaged they had to be returned for repairs.

But before they were returned, they were inspected by the container engineer, who recognized the cause of damage as being due to the failure of improperly designed crates. The engineer then made a trip to the manufacturer where he suggested certain corrections in crate design. The suggestions were adopted and subsequent cars of heaters arrived at their destination without damage.



Closeup of windwill pump crate improperly constructed. Note lack of diagonal bracing

controlled by the rate at which air is allowed to escape from it, and is not affected by the conditions in the other circuit. In one, the control circuit, the pressure is controlled by a micrometer adjusted metering valve. In the other, the gaging circuit, the pressure is controlled by two "caliper bars" which measure the bore diameter. The pressure in the two circuits acts on opposite sides of a diaphragm.

Orifices in the two circuits are adjusted so the pressure in the gaging circuit is greater than that in the control circuit, when the bore is smaller than the desired size. As the bore reaches size this pressure drops below pressure in the control circuit and the diaphragm is moved. The movement of the diaphragm operates an electrical switch which stops the expansion of the tool. When all six bores are to size the tools are collapsed and withdrawn.

To be used on Plymouth cylinder blocks, this type of automatic sizing may be adapted to all types of bores over 2 in. diameter. Ports, undercuts, or heavy stock removal do not affect accuracy.

—o—

Babcock & Wilcox Tube Co., New York, recently issued a revised version of its linear table which converts inches and fractions of inches to decimal parts of a foot. The table, "Technical Data Card No. 110A," effects savings of time for those who deal with products, such as tubing quoted on a per 100 ft basis.

—o—

Consisting of 100 per cent solids, a new liquid formulation provides a method for protecting process equipment such as pipe, valves, fans and rotors. Known as Tygoflex, it may be applied by dipping, spraying or brushing and, after subjection to heat for a short period, converts to a thick, protective insulator. It may be be applied to any surface. A single dip produces thicknesses ranging from 1/16 to 1/4-in.

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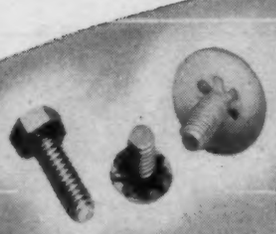

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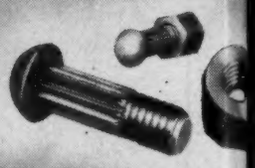

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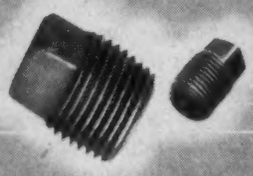

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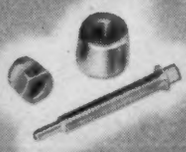

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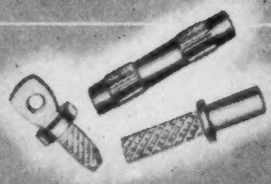

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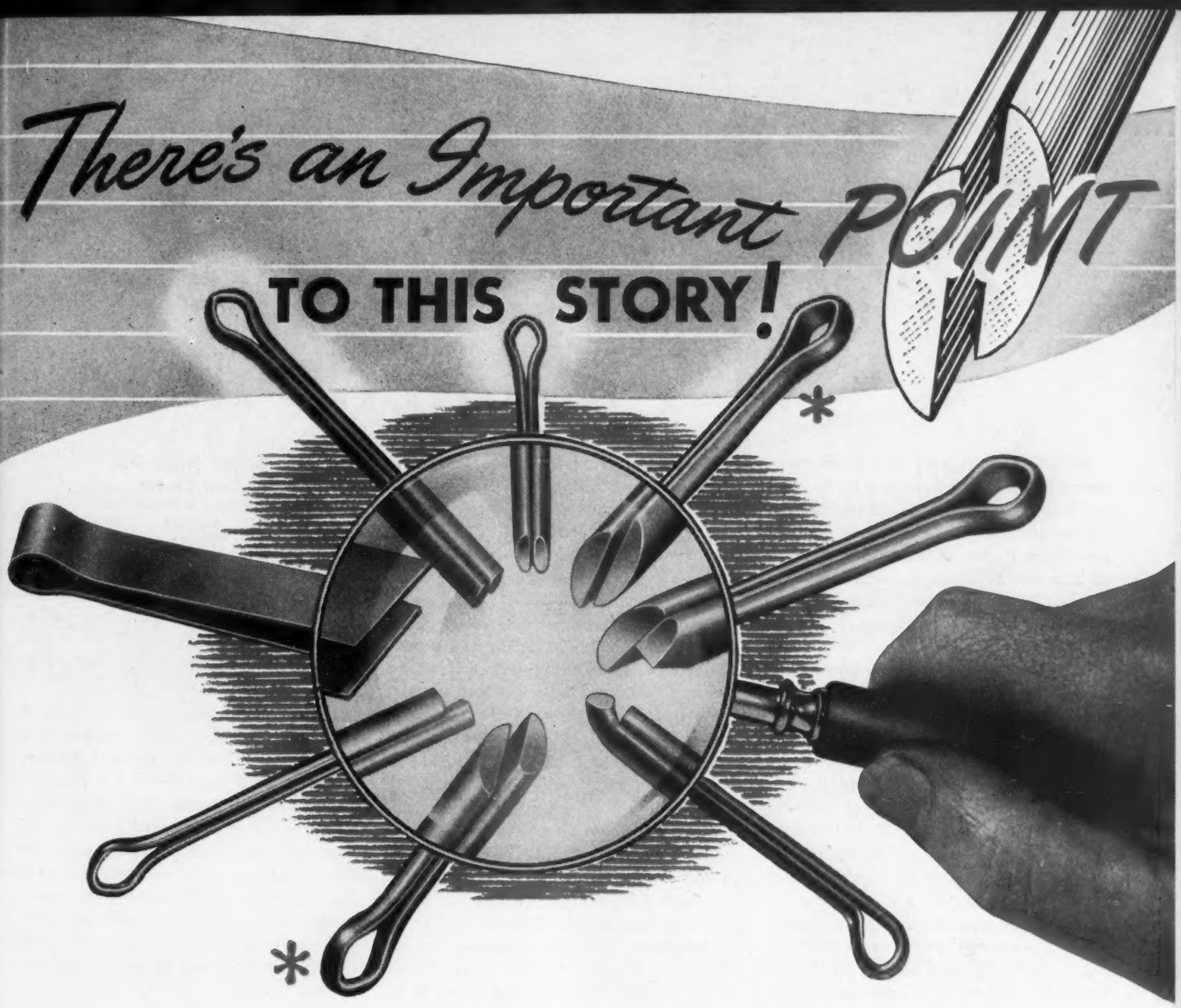
There's an Important POINT TO THIS STORY!



An important question to ask yourself in buying cotters is this: are they engineered to give maximum speed and efficiency in assembly operations—to eliminate time-wasting, money-wasting and fumbling?

Illustrated above are the seven basic point designs of Lamson & Sessions cotter line. Each one has been developed and tested to perform a specific job faster and more efficiently than ordinary "run of the mill" cotters.

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Lamson cotters are available in sizes from 1/32" x 1/4" to 3/4" x 24" and may be obtained in production quantities in a variety of metals and alloys—steel, brass, bronze, stainless steel and aluminum alloy.

Consider *your* use for cotters and decide from the illustration which point best satisfies your requirements. Or better still, write us, giving details of your cotter applications and we'll gladly recommend the best point for your particular needs.

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Speed and accuracy of volumetric method made possible by use of iron-antimony alloy

RAPID Determination of Tin IN COPPER BASE ALLOYS

By M. SHERMAN
Chief Chemist
Silverstein & Pinsof Inc.
Chicago

SPEED and accuracy of a rapid volumetric method of determining tin in copper base alloys makes its use feasible for furnace control work. The process is made possible by the use of Stanreduce, an alloy of iron and antimony developed by Otis Works, Jones & Laughlin Steel Corp., Cleveland, and sold by Harshaw Chemical Co.

The nitric acid digestion-gravimetric method for tin is most commonly used as a furnace control method in smelting copper base alloys. This procedure has many well known shortcomings. At times there is incomplete recovery of the tin during filtration, due to lack of coagulation of the metastannic acid[3]. In the presence of excessive iron, results for tin are low. In the presence of antimony and phosphorus corrections are necessary.

The production of the iron-antimony alloy[3, 4] suggested a means of working out a rapid volumetric method for the determination of tin in copper base alloys. The method for bronze as given by Saxter and Minto[4] suffers from the same shortcomings as the gravimetric method does, since a preliminary precipitation with nitric acid is carried out.

The destruction of the paper is a time consuming operation and the separation of the reduced tin solution from the Stanreduce requires great care. To save time and to simplify the procedure for use by the average laboratory technician, certain modifications in the use of Stanreduce as originally reported[3, 4] were adopted. When set up for runs, the time for a determination is well under 25 min. For the amounts of tin usually found in copper base alloys the results are within less than 0.05 per cent of the true tin content.

The Method: (1) Transfer 1 g of borings to a 500 ml. flask. (2) Add 2 ml. 1 per cent $FeCl_3$ solution, 15 ml. HCl and 15 ml. 30 per cent H_2O_2. (3) Shake up and let stand till the violent action subsides. (4) Heat until foaming ceases and the solution boils clear. (5) Remove from the heat and add 20 to 25 ml. pulp suspension. (Seven Whatman filter pulp tablets well broken up with a little water and two liters water added. Shake before using). The suspension cools the solution for the NH_4OH addition and also facilitates later filtration.

(6) Add 25 ml. NH_4OH, swirl to mix and raise to a good boil. (7) Filter through a 12½-cm No. 4 Whatman paper and wash the flask and precipitate well with hot 3 per cent NH_4OH. (8) Transfer the paper and precipitate to the flask and add 175 ml. 7.5:10 HCl and 10 grams Stanreduce. Raise to a quick boil while swirling. (9) Keep the solution at a moderate boil for 7 min from the time the last trace of ferric chloride color has disappeared.

(10) Add a 2-grain double compressed bicarbonate pill to the flask and cool under running water. Be sure there is always a pill in the solution. (11) When cold add 5 ml. starch solution and titrate with standard KIO_3 to the appearance of a blue that lasts at least 30 sec.

Solutions: Standard potassium iodate solution 2.00 g KIO_3; 30.0 g KI; 2.0 g KOH. Dissolve in water and dilute to a liter.

Standardize by running through Bureau of Standards copper base alloys according to the above procedure. A blank should be run and deducted from all titrations.

The danger of losing stannic chloride by volatilization[1] in the dissolving and initial boiling period is negligible. Under conditions of the determination the walls of the flask furnish enough reflux action to prevent the loss. If desired a Kjeldahl trap inserted through a No. 6 stopper may be placed over the flask during the dissolving process.

The importance of thoroughly washing the NH_4OH precipitate cannot be overemphasized. Copper will normally be the chief interfering agent and no trace of blue must be left on the paper. The amount of copper carried down by the precipitate will not interfere if the solution is standardized under the same conditions as the run. For samples containing over 15 per cent tin either a double precipitation should be resorted to or a smaller sample size used.

During titration, swirl the flask so that only the liquid above the Stanreduce rotates. Vigorous shaking would cause a slight re-reduction of the tin. After a little practice we have found in this laboratory that different operators can consistently duplicate each other's titrations within 0.1 ml. The Stanreduce may be reused by washing with hot water, then with alcohol and drying in an oven.

The same method may be carried out without the use of the iron-antimony alloy. For a number of months this laboratory had used two folded 1 x 2 in. 20 mesh iron screens and $SbCl_3$ solution to carry out the reduction in 5 min. Since a great number of tin determinations are carried out here daily the preparation of the screens and antimony solution proved troublesome and also some skill and practice was needed to catch the end point in a solution darkened by precipitated antimony.

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4. Saxter, E. T. and Minto, R. E., "Ind. Eng. Chem.," Anal. Ed., 15, 261 (1943).

Abrasive Chart Simplifies Finishing Procedures

Result of more than three years of research into the problem of proper abrasive selection for various sanding and finishing operations has led to the availability of a comprehensive slide rule type abrasive selector from Sterling Tool Products Co., Chicago. From it may be determined the proper abrasive combinations for 120 specific sanding and finishing problems.

Selector indicates the kind of abrasive for the job, abrasive grit sizes for various finishing operations on many types of material, the type of coating (open, waterproof, etc.) lubricant to be used, if any, and the proper pad to be used on the sander.

STRATEGICALLY-LOCATED
. . . AT COLUMBUS, OHIO
COMPLETELY-EQUIPPED
. . . SOME 400 MACHINE TOOLS, PLUS OTHER PRODUCTION EQUIPMENT
TAPERED ROLLER BEARING PLANT
. . . READY TO OPERATE
FOR SALE OR LEASE

War Assets Administration offers for sale or lease, as a unit, this completely-equipped plant, ready now for immediate production of tapered roller bearings or a similar type of accessory or machinery item.

LOCATION: Plant site, 1025 Cleveland Avenue, Columbus, Ohio. Ready access to both raw material sources and industrial markets.

BUILDINGS: There are 3 buildings as follows: Building "A" (Office, Canteen and Shop) one-story timber frame on concrete footings, cement block walls, built-up roofing, approximately 100,000 sq. ft. of floor area.

Building "B" (Manufacturing Building) one-story steel frame on concrete foundations, composition roofing on concrete slab, reinforced concrete and slag floors, approximately 104,400 sq. ft. of floor area.

Building "C" (Boilerhouse) a ball-bearing building with composition roof on precast slabs on steel beams and purlins, walls are brick and floor is monolithic concrete, approximately 3,500 sq. ft. of floor area.

LAND: Approximately 9 acres, fronting 227 feet on Cleveland Avenue.

MACHINERY AND EQUIPMENT: Various types of production equipment including: demagnetizers, furnaces, heat exchangers, pumps, quenching machines, scales, washers. A complete assortment of machine tools including: lathes and machines used for boring, briquetting, grinding, drilling, honing, lapping, milling. Miscellaneous metal forming and sheet metal tools, laboratory and testing equipment, furniture and fixtures. There are 10 cranes; one 5-ton, five 2-ton, two 1-ton and two portable cranes.

TRANSPORTATION: Plant is serviced by the Pennsylvania R.R. with main line adjacent to property. This property is located in the industrial area of the city with access to several main and secondary highways.

Sealed proposals, in duplicate, on Uniform Bid Forms, for purchase or lease of this property known as the Timken Roller Bearing Plant, Plancor 920, will be received by the Cincinnati Regional Office, War Assets Administration, until June 13, at 2:00 P.M., E.S.T., at which time proposals will be publicly opened and read.

Data herein are not intended as a basis for negotiation. Use of the lessee's name is for identification only and has no connection with the lessee's own facilities. War Assets Administration reserves the right to reject any or all proposals.

Credit terms for the purchase of this property may be arranged. If you qualify as a small business firm, you are entitled to special consideration for purchase through the Reconstruction Finance Corporation.

For an illustrated brochure, with full description of property and for the forms on which to submit your bid, address:

1131-T

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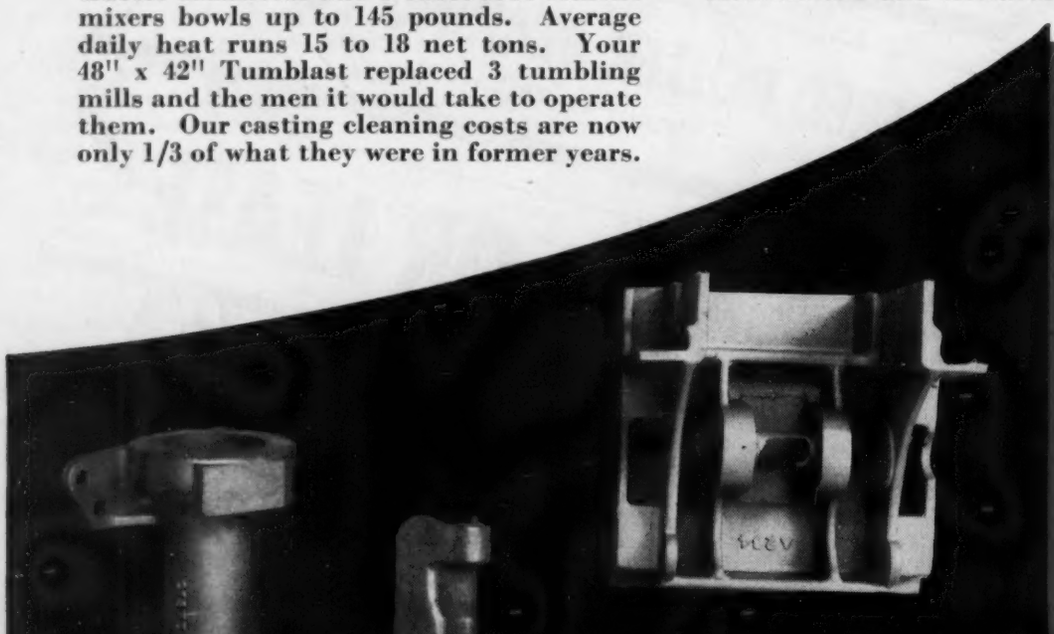
OFFICE OF REAL PROPERTY DISPOSAL

704 RACE STREET **CINCINNATI 2, OHIO**

GOVERNMENT OWNED **SURPLUS PLANTS**

Wheelabrator ..... speed cleaning cost reduction proven for FARM IMPLEMENT MANUFACTURERS

The production manager of a well-known concern has this to say about the airless Wheelabrator: "Our work runs from light agricultural castings—1 to 35 pounds—to tractor manifolds and 3 cubic foot cement mixers bowls up to 145 pounds. Average daily heat runs 15 to 18 net tons. Your 48" x 42" Tumblast replaced 3 tumbling mills and the men it would take to operate them. Our casting cleaning costs are now only 1/3 of what they were in former years. Labor costs run as low as $1.75 per net ton." What the airless Wheelabrator has done for others, it can do for you. Ask for a demonstration . . . or write for further information and literature.



Typical Implement Foundries using the WHEELABRATOR

Inter. Harvester Co.
The Oliver Corporation
Massey-Harris Co., Ltd.
John Deere Tractor Co.
Allis Chalmers Mfg. Co.
David Bradley Mfg. Co.
J. I. Case Co.
The American Fork & Hoe Co.
Wood Bros. Thresher Co.

Reports From Users

12 Tumbling mills and an airblast room were replaced by a 66" Wheelabrator Swing Table at Western Land Roller Co., Hastings, Nebraska. 10 to 14 tons of grey iron castings are cleaned in from 6 to 8 hours. Typical work, which is completely cleaned in 4 minutes, includes 3' x 4' side frames, irrigation pump castings, feed grinder blowers, turbine pump heads, bowl assemblies, etc.

●

The 48" x 48" Wheelabrator Tumblast at Continental Gin Co., Birmingham, Alabama cleans the entire daily production in about 2 hours. It previously required 9 hours to clean these castings using 8 tumbling barrels. An average load in the Wheelabrator Tumblast consists of 1400 lbs. of mixed castings, and the cleaning time ranges from 5 to 8 minutes.

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
509 S. Byrkit St., Mishawaka, Indiana

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

Space-Saving Shift Moves

Large Finishing Ovens

to Plant Roof

Relocated units provide Tennessee appliance builder with 10,000 sq ft of additional floor space

IN a recent program of increased production, Cavalier Corp. of Chattanooga, Tenn. effected an expansion of floor space and improvement of oven facilities at minimum cost by utilizing previously unused roof space, and reclaiming the insulation from an old oven. Cavalier produces home appliances and vending machines which are finished in a wide variety of baked japans, paints, enamels and synthetics. The drying and baking of these finishes is a most important item in production cost.

It was decided to dismantle two of the four ovens in use, remove them to the roof, and reassemble them in order to provide greater floor space within the plant proper. Oven capacity and characteristics were to be improved also.

First oven at Cavalier was installed 15 years ago, and was insulated with 4-in. granulated mineral wool. A second installation some 5 years later was similarly insulated. Upon investigation it was found that this insulation was still in excellent condition despite 10 to 15 years of hard service; a plan was formulated to reuse this mineral wool.

Since the company did not have blower equipment to install loose granulated mineral wool properly, supplemental wool was obtained and the whole compacted into home-made blankets backed with poultry netting. The exposed position of the rebuilt ovens caused the addition of 2 in. to the thickness of the insulation, resulting in 6 in. in the walls and ceiling insulation of the roof battery.

One roof oven will be used for drying prime coats, the other for finish drying. The ovens are housed in a 20-gage galvanized sheet iron paneled structure. Panels are securely ribbed, crimped and welded to prevent moisture penetration as well as to strengthen the external shell. The roof prime coat oven is 8 x 30 x 120 ft. It operates at a temperature range of 430 to 475° F depending on the type of coat being applied. The finishing oven is 8 x 50 x 120 and operates at a temperature range of 230 to 375° F. Both ovens are contained in a common outer shell.

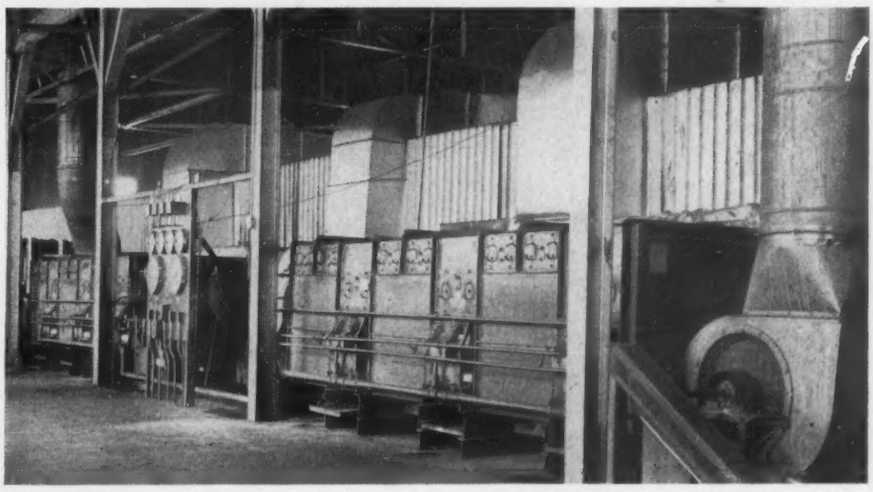
Heating of the roof ovens is accomplished by means of electric red heat resistor units located in the floor. This permits convenient access for replacement from the floor below and makes use of natural convection for circulation of the heat. Due to the low cost of electric power from the TVA all future heating units probably will be electric.

Conveyor lines are led up through the roof into the ovens. This results in nearly total exclusion of heat dissipation back into the work rooms—the tendency of heated air to rise almost completely overcoming heat radiation effect beneath the oven entrances. Overhead conveyor chains are used to carry the work through the ovens from cleaning and spray booths to the assembly and shipping rooms. The conveyors double back within the ovens—three times in the prime oven and five times in the finishing oven.

The remaining interior ovens are similar to the roof ovens but are somewhat smaller—the prime oven being 7 x 30 x 100 ft; finish oven is 7 x 45 x 100 ft. Operating temperatures are the same as those in the roof ovens but oil is used.

Success of this exterior oven using reclaimed mineral wool and electric heating is expected to lead to similar future installations at Cavalier. Such installations are desirable since a minimum of building structure is required, increased production facilities are made available and operating costs are at a minimum.

Interior ovens give some idea of space saved when a similar unit was moved to the plant roof. Oil-fired heaters in foreground recirculate warm air through the ovens



Effective Use of Steel Prevents Fire Losses

Formulation of proper design standards for structural members formed of light gage sheet or strip steel was the object of the more than 700 tests recently completed by the American Iron and Steel Institute in the interest of cutting fire losses and lowering building costs.

This type of construction lends itself to fire safety with economy, stated B. L. Wood, consulting engineer of the institute in an address before the American Institute of Architects. In his opinion, the science of fire protection and building regulation must keep step with the progress made by the building industry if advantage of that progress is to be taken and the already serious fire losses are to be reduced.

Financial advantages not generally recognized are shown in the flexibility afforded the architect through the use of fire-resistive construction. Wood reported that a study undertaken by the AIA for the AISI, the American Institute of Steel Construction and the Steel Joist Institute to develop accurate cost information relative to fire-resistive construction in 6-story multiple dwellings in New York showed that this type of construction averaged a 7.1 per cent higher rental income with an average cost increase of 5.1 per cent over comparable nonfire-resistive structures.

When Grandmother Met Her First Tin Can

PAINTED FOR JONES & LAUGHLIN STEEL CORPORATION BY ORISON MAC PHERSON

YOU WOULDN'T HAVE FOODS IN VARIETY AND ABUNDANCE —WITHOUT STEEL

Without steel, in the form of tin plate, you could not be supplied with foods essential to modern living. You would still buy groceries in the old general store, as your Grandparents did. Selection would be small. You might be offered a few items packed in cans as "something new." The cans would be crudely handmade of sheet iron coated with tin. Your favorite vegetables and fruits generally would be out of season, unless you put them up at home.

But, today, because of containers, caps and closures made of tin plate such as Jones & Laughlin Steel Corporation produces, there await you in bright, clean, food stores thousands of different wholesome, appetizing products of the fields, orchards and waters of America and foreign lands. They are packed and processed at the peak of their perfection in sterilized containers guarded by tin-coated steel. They are never out of season to you.

Tomorrow, through steel research such as Jones & Laughlin pursues continuously in production of its line of Controlled Quality steels, your family table will be served by even finer and better tin plate. Less time will be required for preparation of good breakfasts, dainty luncheons and full-course dinners. There will be more leisure to enjoy life.

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CONTROLLED QUALITY STEELS

J&L STEEL

CONTAINERS

The general store of 50 years ago, neighborly and picturesque with its jumbled stocks of bulk groceries, dry goods, notions, shoes, clothing and hardware, would dismay a young woman of today out to buy food for her family table. In its stuffy, gloomy interior, vegetables and fruits were available only when in season locally. Sugar, salt, potatoes, dried apples and beans in open bags had no protection from pollution. Everyone's hands dug deep into the open cracker barrel. The molasses barrel was infested by flies. Dried fish and cheese were exposed on the counter. Pickles were dipped out of kegs. Salt mackerel was fished from open buckets. As refrigeration was unknown, tubs of butter and lard were kept in the damp cellar. There were a few cans of "cove" oysters, salmon, tomatoes, corn, peas, and peaches.

The cans Grandma bought were filled by hand at the rate of a few score per hour. Modern automatic canning machines fill several hundred cans a minute.

Fruits, fish, vegetables were broken up and shoved through a small hole in early tin-coated iron cans to fill them. Then a disc was slowly soldered in place by hand. With adoption of open-end steel-and-tin can about turn of century fruits, fish, vegetables could be canned whole or in large pieces. Change from iron to steel sheets coated with tin provided a more workable tin plate for new automatic can machinery.

Foods are cooked in cans, scientifically, at cannery. Each steel-and-tin can is a miniature "pressure cooker." No chance for fruits and vegetables to lose vitamins.

45 million cans a day are opened in this country to serve us with 2500 products.

Many farms and orchards, right near the canneries, grow finest "pedigreed" produce especially for canning. No food or flavor losses due to long transportation!

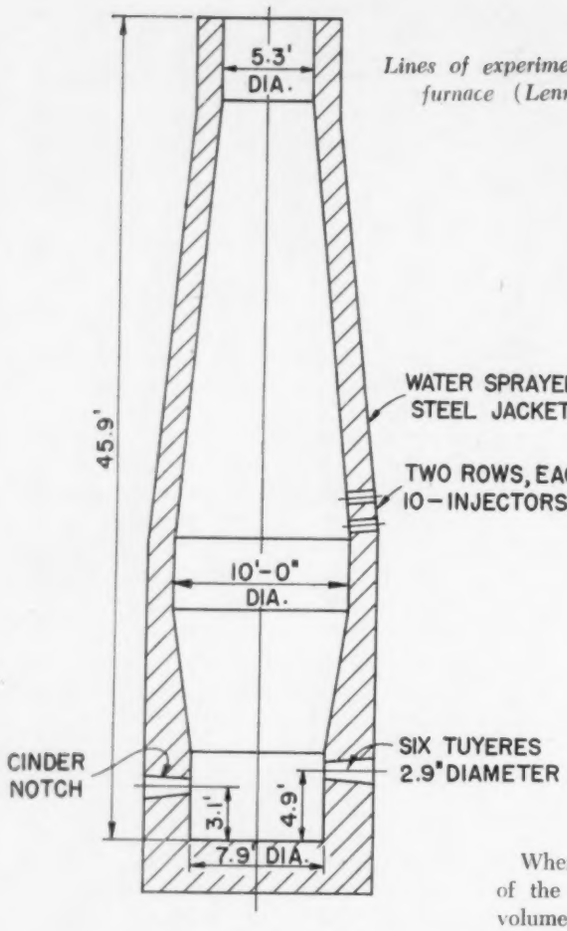
Better fruits and vegetables that we enjoy today are result of years of experiments by food packers and can manufacturers. Both do research work to improve color, size, hardiness of plants used for food.

"Serve canned foods proudly" says the Can Mfrs. Institute, Inc., "and thank the modern can for the safety, convenience and economy it brings into your domestic life."

Now, oatmeal porridge precooked and packed in hermetically sealed tin cans. Serve with canned bacon, orange juice, coffee.

Healthful minerals are present in liquid found in most canned vegetables. Use them!

Meals of meats in tins, many different combinations, are on your grocer's shelves or soon will be, according to the National Meat Canners Assn. These include beef, veal, pork, ham, bacon, poultry, in combinations with vegetables for quick preparation of good meals.



Lines of experimental blast furnace (Lennings)

By KURT NEUSTAETTER
Blast Furnace Engineer
Inland Steel Co.
Indiana Harbor, Ind.

Oxygen Enriched Blast

Known facts concerning prospects of increasing oxygen content of air blown into the blast furnace are related by the author

IDEA of increasing blast furnace output and efficiency by raising the oxygen content of the blast is approximately 35 years old. The subject is intriguing and the question is why so little progress has been made.

Plans are formulated to run a ferromanganese furnace on enriched blast in this country; nothing definite is known about the state of affairs in Russia; and Germany never has gotten beyond runs on an experimental furnace.

So, any discussion will have to be confined to theory, to the German experimental runs which have been described in great detail, and to what meager and vague information has come out of Russia.

The problem has been discussed more widely in recent months and an effort is made to summarize what is found in the literature.

Theory of Oxygen Enriched Blast: In developing the theory of oxygen enriched blast the outline of Wilhelm Lennings of Germany who has presented it in a clear and comprehensive manner, will be followed[1]. The other sources agree with his findings and controversy is strangely absent.

When using oxygen enriched blast the amount of gas passing through the furnace will be changed as well as its concentration and its heat content. See Table I.

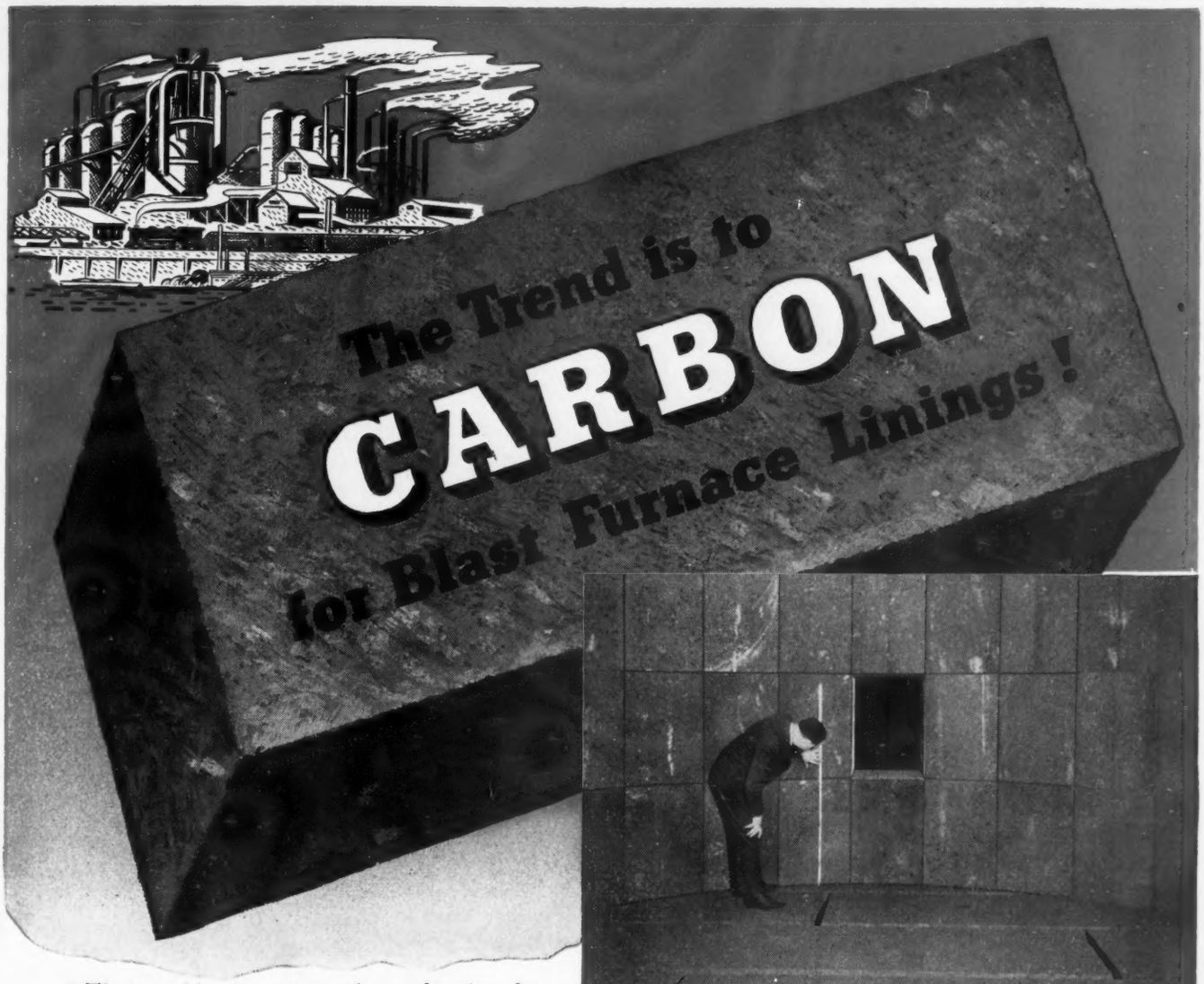
When increasing the oxygen content of the wind to 30 per cent, the wind volume blown drops to about 70 per cent, and the gas produced to about 75 per cent of the previous amount. This means that the pressure drop through the furnace will decrease and the movement of the stock will be facilitated. In proportion to the decrease in wind blown, the sensible heat carried into the furnace with the wind will decrease, and this decrease in heat cannot be made up for by higher combustion temperature, because the number of Btu's produced by burning a certain amount of coke always will be the same. The lack in heat due to the smaller amount of wind blown cannot be made up for except by increased blast temperature, because it just is not there.

Now if we assume that the gases going up through the furnace give off the same amount of heat to the stock in both cases it follows logically that a lower top heat will result. The difference in temperature between hearth and top is considerably increased due to both increased combustion temperature and lowered top temperature.

Promoters of oxygen enriched blast claim that the higher hearth temperature can be used to great advantage. The melting process takes place at much higher temperature, there will be hotter, higher silicon iron at no increase in coke rate, or else the hearth temperature can be maintained at the old level by burdening at a lower coke rate.

Of course this latter procedure will mean that still less gas is available for preheating the stock and that the top temperature is lowered still more, while the heat requirements are decreased only by the small amount necessary for preheating the coke saved. Here we see one definite limitation of the use of oxygen enriched blast. By increasing the oxygen content of the blast we soon will reach a point where the heat content of the gases leaving the lower parts of the furnace will not be sufficient any more to cover the heat requirements of the upper parts of the furnace. This will happen at different oxygen contents for different grades of iron. The more coke there is required, the more heat carrying gases will be produced. Lack of heat in the upper parts of the furnace can be remedied by introduction of hot gases into the furnace at some level above the mantle. Also using burnt lime in place of limestone will help to keep up the top temperature.

All this means that to a great extent higher blast temperature and more oxygen in the blast compete with each other. Lennings has figured out that a difference of wind temperature of 180°F is the equivalent of 5 per cent oxygen insofar as heat effect in the hearth is concerned. This makes stove capacity and ability of the furnace to take heat important factors when considering the advisability of using oxygen enriched blast. Very high blast temperature impairs the movement of the stock, not because the hearth is too hot but because the volume of the gases going up through the furnace increases with the temperature. Therefore we can assume that the disturbances due to too hot blast



Interior of hearth lining looking toward iron notch. Blocks may be of any size desired up to 24x30x180 in.

● The trend is strong toward use of carbon for blast furnace linings. Why? Just consider the valuable advantages of this basically different kind of lining material—

1 Lasts indefinitely!

A properly-installed carbon block lining in a blast furnace should last indefinitely. This results from the remarkable physical properties of carbon: no melting point, low thermal expansion, highly resistant to thermal shock, not wet by molten metals, immune to metal and slag attack, mechanical strength maintained at high temperatures.

2 No Salamander!

Years of experience with carbon linings bears this out. Consider what a saving this feature, alone, can mean to you.

3 Fast, easy to install!

One carbon block can take the place of from 50 to 1000 nine-inch firebrick, depending upon the size of the block. Overall installation time is thus greatly reduced.

4 Economical in long run!

Operating experience is proving that carbon linings are definitely more economical in the long run . . . as is evident from the features outlined at left.

WHATEVER YOUR PROBLEM — CONSIDER CARBON OR GRAPHITE

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Engineers at National Carbon Company, Inc., will be glad to supply you with full available information on all phases of installing a carbon lining. Write today **to Dept. ST.**

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TABLE I

DATA ON VARIOUS PERCENTAGES OF OXYGEN ENRICHED BLAST

	Percentage of O_2		
	20.9	25.0	30.0
Wind: normal cu ft/lb C	71.0	59.4	49.5
Gas produced by combustion, normal cu ft/lb C	86.0	74.2	64.3
Heat content of wind, Btu/lb C at wind temp. of 1292° F	1018	850	709
Heat content of combustion gases, Btu/lb C at wind temp. of 1292° F	3945	3777	3636
Combustion temp., °C	2069	2267	2487

TABLE II

SMELTING TESTS WITH OXYGEN ENRICHED BLAST (LENNINGS)

	Basic bessemer burden, rich ore		Lean German ore	
Oxygen in blast, %	20.9	25.1	20.9	26.0
Blast temp., °F	1326	1645	1661	1578
Slag volume, lb/ton iron	1130	1164	5178	5026
Coke cons., lb/ton iron	1870	1746	3060	2608
Top gas temp., °F	536	372	491	228
Indirect reduction, %	51.6	48.8	42.8	50.0
Top gas:				
% CO_2	10.0	11.7	6.84	9.90
% CO	30.1	34.9	32.60	36.30
Iron production, tons/day	96	115	38	57
Blast vol. cfm	5950	5380	4260	4290
Flue dust, % of burden	8.3	5.9	2.6	1.4

will not occur when using oxygen; in this respect oxygen will not act the same as increased blast temperature.

The higher temperature in the hearth of the furnace can be used to melt slags with higher melting points. This primarily means limier slags of the same viscosity we are used to now. This is particularly desirable when manganese recovery is important as in the case of spiegel and ferromanganese. It also has been proposed to produce slag of the composition of portland cement.

Lennings' Test Runs: Accompanying sketch is of the experimental furnace used by Lennings. The hearth diameter was 7 ft 9 in.; six 2.9 in. tuyeres were used. The gas injectors shown were used to admit highly heated top gas. The furnace was cooled by sprays on the shell. Oxygen was admixed to the cold blast before entering the stoves; it was produced by the Linde process and contained 42 per cent O_2.

As a rule the tests were run first with limestone and air, then with burnt lime and air, and then with burnt lime and oxygen enriched air. There was little difference however between the runs with limestone and burnt lime; so this complication was omitted from Table II[3].

Whenever the burden or oxygen content was changed the furnace was permitted 10 to 14 days to reach an equilibrium; then seven days without wind loss were regarded as the test days. There were no major variations in the raw materials or the analysis of the iron produced. The wind pressure was maintained at 5.79 psi.

Results of two representative runs are given in Table II. In both cases there is a moderate drop in coke consumption, a considerable drop in top heat, increased direct reduction, increased iron production and less flue dust.

The tests turned out exactly as predicted by the theorists. There was the expected increase in production, decreased coke consumption and decreased top heat. The stock traveled more easily and the furnace worked more smoothly. The quality of the iron deteriorated due to too fast travel when the oxygen was raised over 30 per cent. This occurred also when no hot gases were blown into the shaft of the furnace and thus the stock was not properly preheated.

Russian Papers: The Russian papers are not as concise as Lennings'. There is much talk about what is going to be done and rather vague reports about successes achieved. Great stress is laid on manganese recovery and utilization of the slag for the manufacture of cement.

Shapovalov[3] describes tests carried out on a furnace of a working volume of 218 cubic meters or 7699 cu ft; the hearth diameter was 10 ft 4 in.

Two tests runs on 10 per cent silicon ferrosilicon were made, one with 25 to 27 per cent oxygen and one with 29 to 33 per cent oxygen. With an oxygen content of 25 to 27 per cent the furnace ran smoothly. The output obtained was 100 tons per day without oxygen, 160 to 180 tons per day with oxygen; the coke consumption decreased from 4600 to 4000 lb per ton of iron. The top temperature was 580 and 450°F respectively. With 33 per cent oxygen the furnace was hanging and the blast temperature had to be lowered to remedy this. Nevertheless production rose to 210 to 230 tons per day and the coke consumption dropped to 3200 lb.

Critical Review of Problem: Now the question to ask naturally is: Would you be willing to try oxygen enriched blast provided there is a cheap enough source of oxygen? Is this going to be a disappointment the way some other beneficiation of the blast has been in many cases?

The dry blast, in the author's opinion, was no success on some modern furnaces producing basic iron from Lake Superior ore because its use constituted an attempt to cut coke consumption without replacing the indispensable voids lost when cutting this coke consumption.

This particular reason for failure does not exist for oxygen enriched blast. It is true that voids are being lost the same way they are with dry blast, but with oxygen this is accompanied by a considerable drop of the gas volume going through the furnace. In this case less voids are necessary.

But there are undoubtedly other factors which might throw a monkey wrench into the works; and Lennings himself admits that he cannot exactly foresee how everything will turn out on a large furnace.

A substantial drop in top heat for modern, efficiently operating blast furnaces is not permissible. Efficient large furnaces will average a top heat of maybe 275°F. In this case a drop of another 40° is the most permissible without running into danger of sludge formation in the uptakes and the dust-catcher. Furnaces operating on slack wind or small coke have reached the danger point already and no further drop in top heat could be taken.

Less efficient preheating of the stock might be much more serious in a large furnace than in a small furnace. Slag formation would be at a lower level in the furnace and there will be more direct reduction.

The lower level slag formation probably would require a change in the bosh angle and the low top heat of course could be met by a lower furnace. But changes like this are irreversible and there will be no way back for the particular furnace in question.

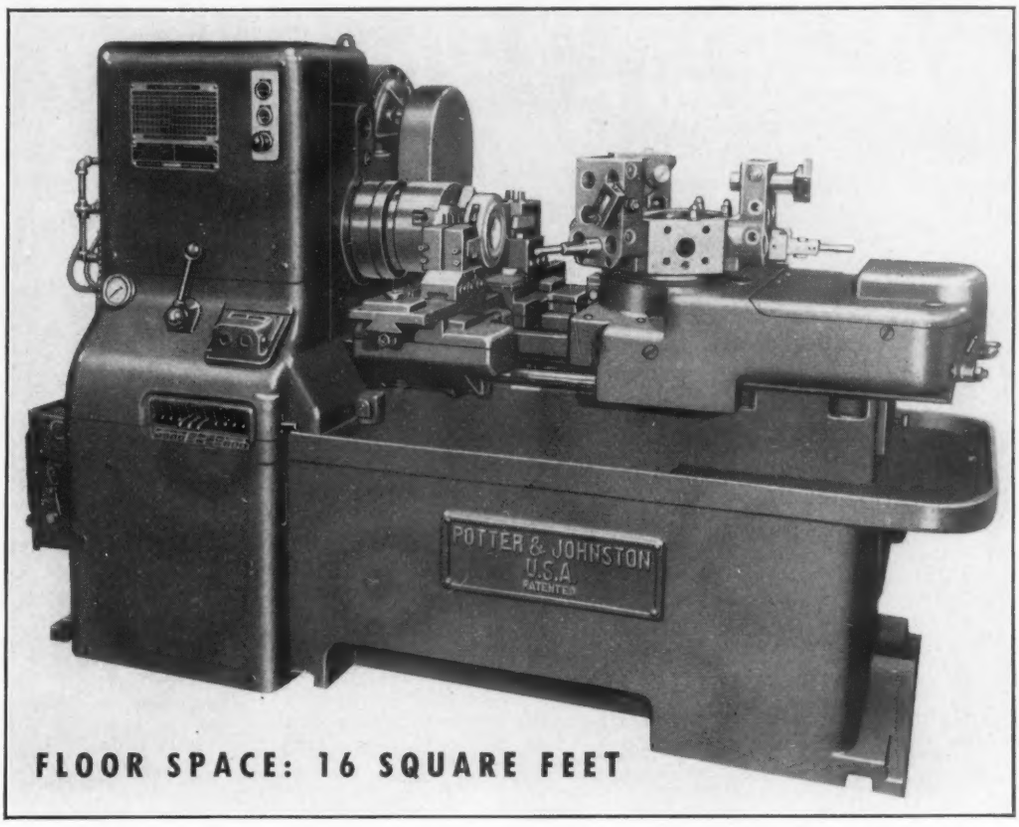
A very vital question is whether the oxygen can be provided at a reasonable price. What is reasonable will depend on how successful the oxygen operation will be and on many local peculiarities. Another vital question is how well the oxygen-providing machinery will work.

The German and the original Russian tests used oxygen produced by the old established Linde process. This process however requires a relatively large plant and investment and the Russians were not too successful in running the plant on a large scale. In fact the difficulties were such that the operation of their test furnace with oxygen enriched air had to be discontinued.

Recently the Russians have been talking about a new process to produce oxygen: the so called Kapitsa turbine. Details are not known as yet.

The chances for introduction of oxy-

(*Please turn to Page* 133)



FLOOR SPACE: 16 SQUARE FEET

Versatility of Tooling

The Potter & Johnston new 3-U Speed-Flex Automatic Turret Lathe, with its power and high speed demanded by carbide tooling, is characterized by the versatility of its tooling. It can be set up to perform a single operation, or multiple operations simultaneously. *The machine makes a complete cycle of operations in 24 seconds!* It has 48 changes of speed arranged in six sets of four automatic changes; Lowest 36 R.P.M., Highest 1445 R.P.M. It has 24 feeds arranged in geometric progression from .0023 to .0684, or from .0042 to .125 per spindle revolution. All the innovations and improvements built into the new 3-U are designed to improve the quality of the production, and at the same time cut the cost per piece. In the final analysis, this is the main function of the machine—and if you are about to select machines for your production line, we respectfully suggest that you consider the advantages offered by this latest P. & J. development, the 3-U Speed-Flex Automatic.

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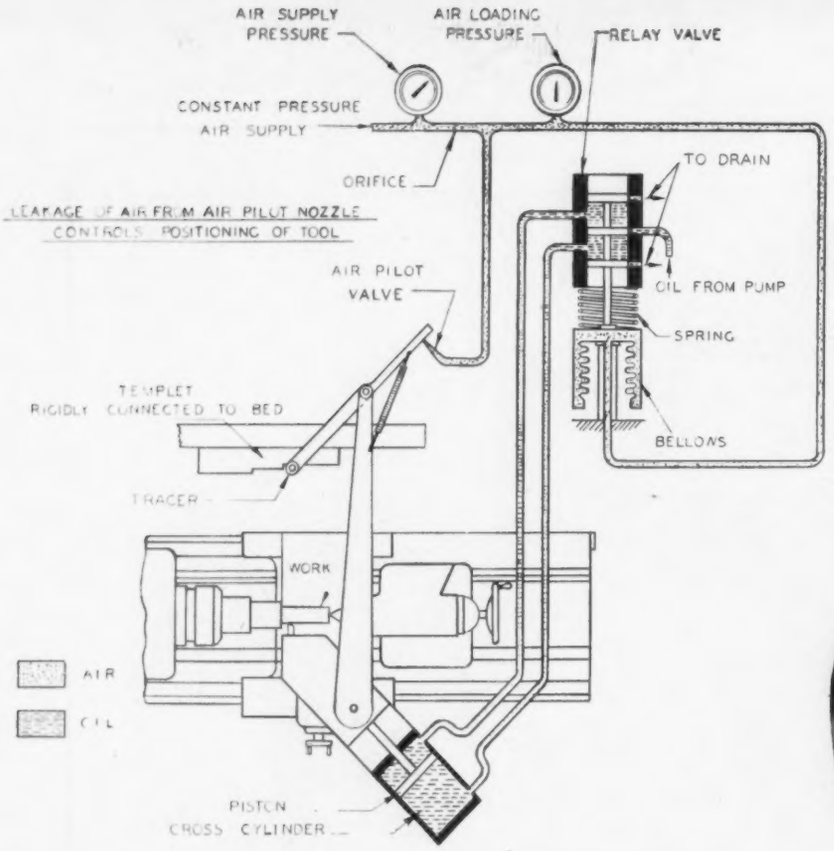
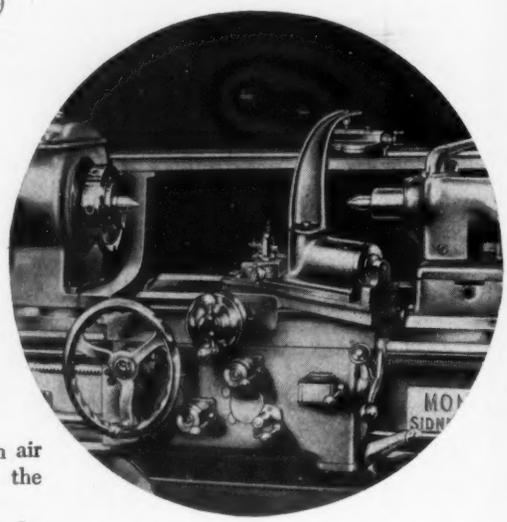
POTTER & JOHNSTON MACHINE CO., PAWTUCKET, R.I.



AIR SCANNING

Simplifies Irregular Contour Work



COMBINING a hydraulically-operated circuit to produce work pieces with contours matching those of a master template, a new contour device introduced recently by Monarch Machine Tool Co., Sidney, O., provides accurate sizing, automatically, in turning, boring and facing of irregular contour work on the company's toolroom or engine lathes. Shown in Fig. 1 (right above), it matches the master template within a limit of tenths.

Under an exclusive license from Bailey Meter Co., Cleveland, who first developed the Air Tracer 2 years ago, Monarch has improved design of the control. Operation is fairly simple. As shown in Fig. 2 (directly above), the template is scanned by a spring-loaded air tracer working on the air gaging principle. Air from constant pressure source is supplied to the system through an orifice of such size as to maintain air loading pressure of 35 psi with the mechanism in balanced position.

Air loading pressure established by the tracer controls operation of tool slide through the hydraulic relay valve. With the air tracer valve in complete balance the tracer operates with approximately 5 oz of pressure against the template.

While the tracer is scanning a straight section of a template, the balance of the air loading pressure is not disturbed and the tool slide is locked in position by an equal amount of pressure on both sides of its actuating piston. Slightest change in template shape increases or decreases air loading pressure by changing rate of flow from air tracer valve. Instantly, the amount of tracer movement from its balanced position is amplified into hydraulic relay valve motion in a ratio of 1 to 100.

Actuation of the hydraulic relay valve is through a flexible metal bellows which breathes during air pressure variation, causing it to balance continuously in a position determined by the air loading pressure. As the hydraulic relay valve stem is attached to the free end of the bellows, movement of the valve likewise corresponds to the air loading pressure.

Lathe carriage is moved by the usual power or handwheel feed. Because the tool slide is set at a 45-degree angle, the tool follows a path relative to the work which is the result of movement of the carriage and hydraulically operated tool slide.

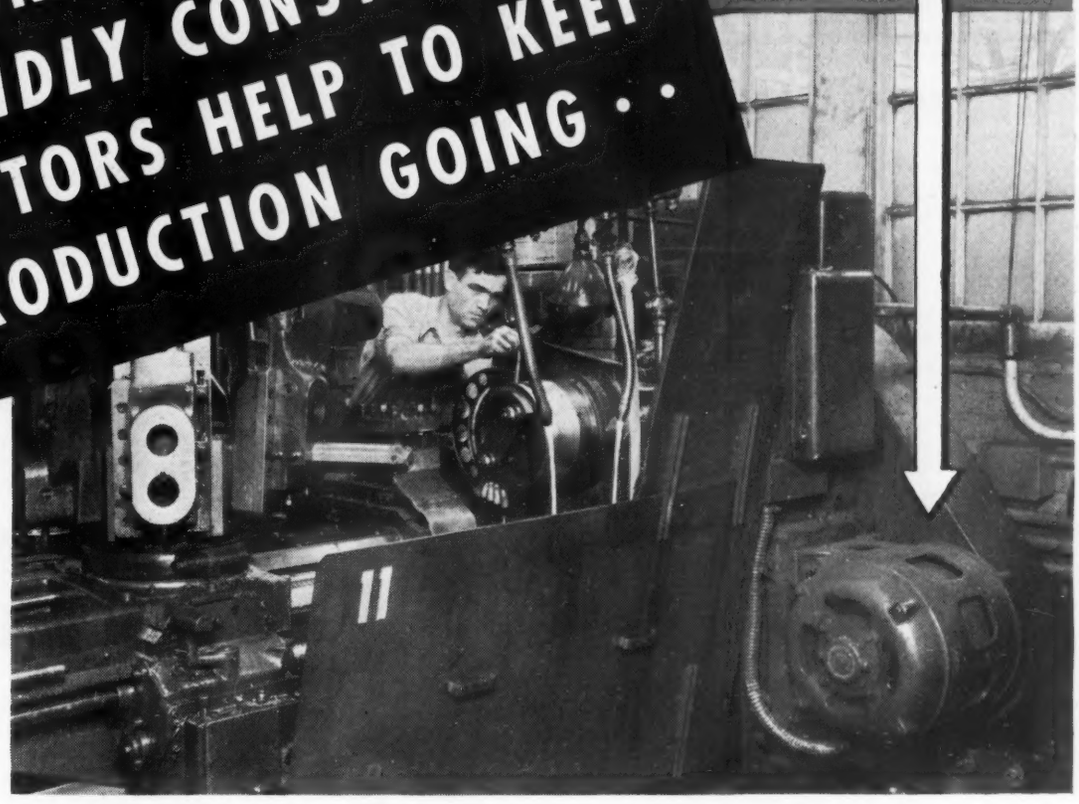
ASM Handbook Contains Large Tool Steel Section

Twelve of the nation's technical leaders in the tool steel industry, members of the tool steel committee of the American Society for Metals, Cleveland, have completed their correlation of data in connection with the society's 1947 Metals Handbook. Soon to be published, it will be the first publication since the 1939 edition.

The handbook's tool steel committee consists of S. C. Spalding, chairman, American Brass Co., Waterbury, Conn.; W. L. Badger, General Electric Co., West Lynn, Mass.; A. D. Beeken, Vulcan Crucible Steel Co., Aliquippa, Pa.; J. P. Bindyke, Heppenstall Co., Pittsburgh; G. E. Brumbach, Carpenter Steel Co., Reading, Pa.; W. R. Frazer, Union Twist Drill Co., Athol, Mass.; W. H. Macmillan, Remington Arms Co., Inc., Bridgeport, Conn.; W. E. Mahin; Armour Research Foundation, Chicago; J. H. McCadie, National Twist Drill & Tool Co., Detroit; J. E. McCambridge, U. S. Navy Yard, Philadelphia; H. E. Replogle, Universal-Cyclops Steel Corp., Bridgeville, Pa.; and G. A. Roberts, Vanadium-Alloys Steel Co., Latrobe, Pa.

Seventeen articles have been prepared by the committee for inclusion in the handbook. They summarize heat treatments recommended for the tool steels used in industry. In order to correlate the large amount of information available and to reduce the number of steels to manageable proportions, it was necessary to prepare a condensed tabulation of tool steels according to the principal types that are used. Thus, the field of these special steels was reduced to approximately 50 principal types.

WHEN PARTS MUST BE ACCURATE—CENTURY RIGIDLY CONSTRUCTED MOTORS HELP TO KEEP PRODUCTION GOING . .



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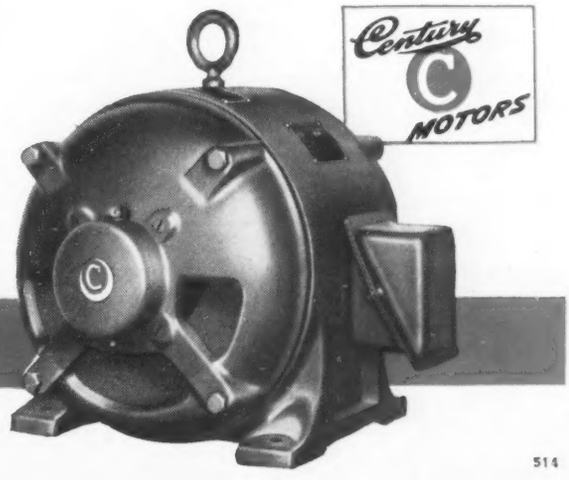

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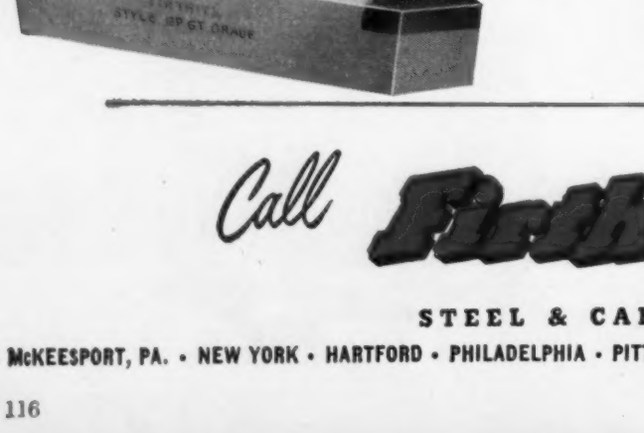

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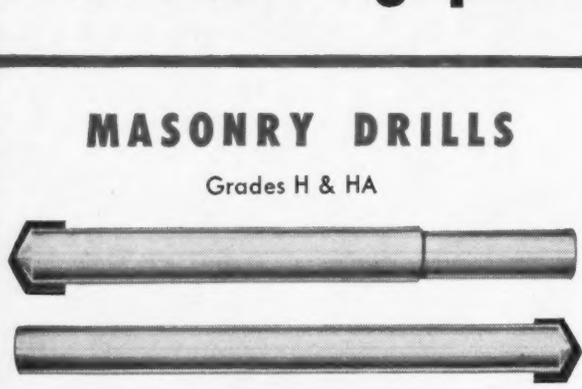
Grades H & HA



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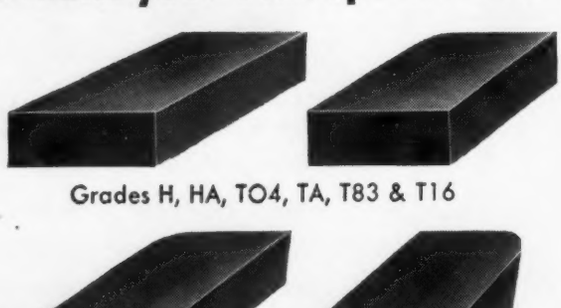

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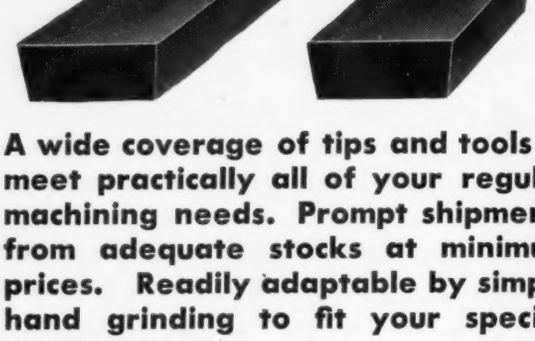

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Coolants

(*Continued from Page 83*)

secure a satisfactory emulsion. Soft lake and river waters, where available, present no problem. However, hard well waters (300-700 parts per million hardness) which sometimes contain minerals, salts, etc., make for some difficulty in preparing uniform, stable emulsions. Ordinary emulsions made with hard water tend to break readily, that is, separate into a stratified condition upon standing wherein a layer of oil or heavy creamy emulsion floats on the surface of a much leaner emulsion than was originally prepared. For many applications such separation is extremely detrimental to good coolant efficiency. In the case of grinding, severe wheel loading will result very quickly.

There are two methods by which water hardness may be overcome, either by special formulation of the soluble oil or by pretreatment of the water. The first approach entails certain difficulties for the soluble oil manufacturer but has been accomplished. The pretreatment of the water is a common practice in industry. Various commercial water conditioning agents are available, consisting usually of polyphosphate combinations. Ordinary tri-sodium phosphate as a water conditioner is well known. The general rule for use of these materials is to add about 1.5 oz per 100 gal of water, per grain of hardness. This amount produces a soft water which emulsifies practically any soluble oil or compound readily. If the water hardness in ppm is known, divide by 17 to secure the grain hardness. For example, a sample of well water has hardness of 340 ppm. This is equivalent to 20 grains hardness. To treat this water for the purpose of making good emulsions, it would be desirable to add about 2 lb of water softener per 100 gal of water. Hard well waters range from about 20 to 40 grains hardness. Soft lake, pond, and river waters may range from 3 to 10 grains hardness.

Water treatment should always be made prior to adding the soluble oil or compound.

Prolonging Service Life: Before an emulsion is put in the machine system for service, certain precautions should be taken to insure good operating results and reasonable service life. First among these is cleanliness. The importance of this point in handling emulsions cannot be overstated. The system itself should be thoroughly washed out and flushed. Deposits of any type should be removed, particular attention being given to corners, angles, and pockets where these may have collected. Soluble oil emulsions are very susceptible to contaminants. If there may be any reason to suspect the presence of bacteria in the previous coolant contained in the system, a flush of the cleaned out sump with a germicidal solution would be in order before putting in the new coolant. These precautions will pay dividends in insuring maximum usefulness of the new emulsion and avoiding such things as premature separation of emulsion, development of odors, bacteria propagation.

By the same token, care of the emulsion while in service is similarly desirable. Extraneous contaminants of every sort should be avoided. Dirt, chemicals, food particles, oil, grease, etc., must not be allowed to get into the emulsion if best results are desired. Chips, grinding grits and dust formed in the metalworking operation and carried into the coolant system should be removed regularly with suitable settling tanks, filters, and strainers to avoid their effects on the emulsion stability.

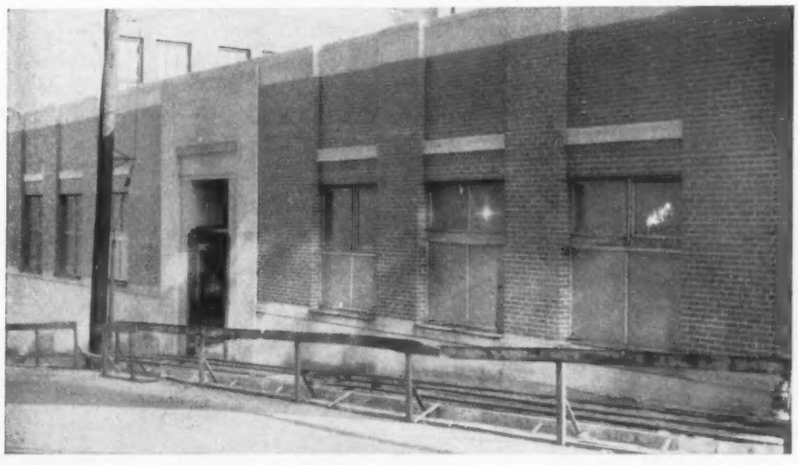
Germicides may be introduced in several ways in the coolant to minimize and control possible bacteria growth. Many good soluble oils and compounds already contain them so no additions are required to the emulsion. Where they are not so introduced, some operators add a germicidal solution of the water soluble type directly to the emulsion. Bacteria or germs may enter the coolant system in the water, particularly if it is hard water of the kind containing mineral sulphur bearing compounds, or through contamination by contact with a workman having an infection on hands.

Keeping the coolant and coolant system clean, maintaining ordinary sanitary precautions among workers, and use of a good germicide in the system will usually minimize to the point of nonexistence, so-called cases of industrial dermatitis, Shell engineers observed.

Industry practice varies regarding the length of time a coolant is kept in service in a given system. This time may vary from 1 week to 6 months depending on production on the machine, maintenance of cleanliness, shutdown practice, temperature control of coolant, and control of emulsion concentration. Obviously, a high rate of production accelerates the extent of contamination of the emulsion from chips, grits, dust, dirt, etc. Continuous operation, however, serves the useful purpose of continual aeration of the emulsion. Where machines are shut down over a week-end, particularly in the summer time, a scum layer forms over the surface of the stagnant emulsion. This condition in warm weather is conducive to bacteria growth, if present, odor development, and general deterioration of the emulsion. It can be combatted by maintenance of cleanliness, suitable germicides, and in other ways.

Cooling and Concentration Control: Cooling of the emulsion is not only useful in extending its service life but has also proved by tests to result in better machining finish, greater production and longer life. An optimum temperature range for emulsions used in machining has been found to be from 55-70° F. Cooling can be accomplished by natural radiation through fins and air passages, fan-cooled radiators, water cooling coils and water jackets, or by mechanical refrigeration.

Another control for better service of



JANITOR'S DREAM: Embedded in concrete and carrying steam to maintain temperature of pavement above freezing, welded coil of wrought iron pipe will keep sidewalk area 100 x 6 ft in front of Heekin Can Co. clear of ice and snow. The Cincinnati company's new one-story office building, 86 x 100 ft, is radiant heated with grid type coils of similar piping. Photo courtesy A. M. Byers Co., Pittsburgh

The Squeeze that ...with lower costs

You can produce cylindrical or ring-shaped parts faster and more economically from Rockrite Tubing than from commercial seamless tubing. Why? ... because Rockrite Tubing is sized to closer tolerances, and with less eccentricity.

These factors result in more finished products per machine-hour. Machining is faster and costs less. In fact, many parts which, in the past, have been most economically turned out from bar stock can now be made out of Rockrite heavy-wall tubing with substantial production savings.

Here's how the Rockrite Process does it ...

CLOSER TOLERANCES

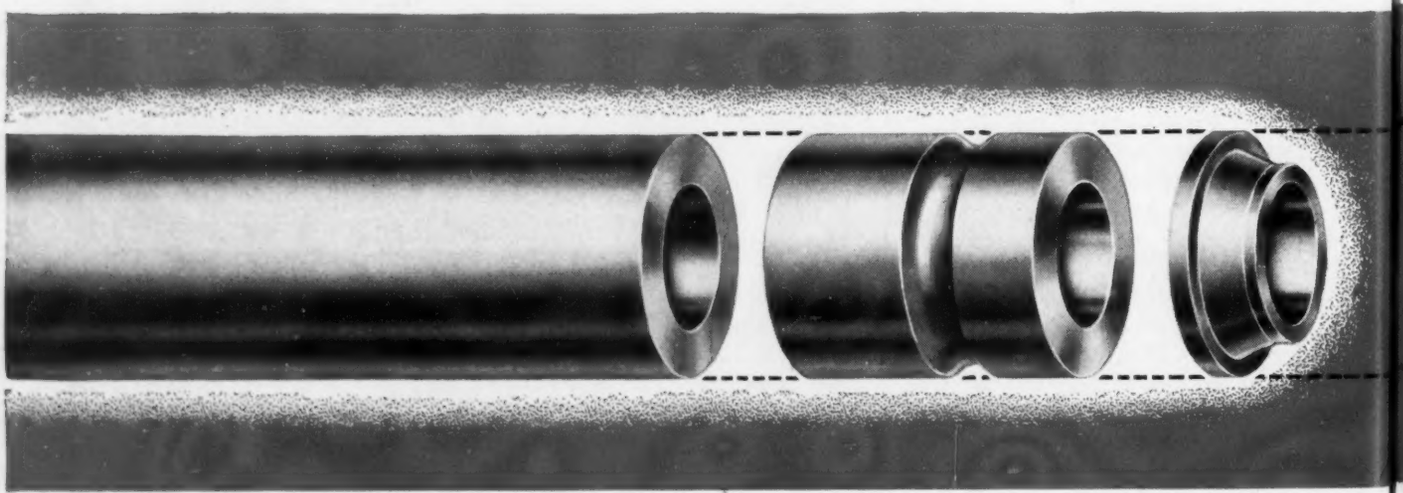
Rockrite Tubing is sized by compressing the metal by cold rolling in a controllable operation. Semi-circular grooved dies rock back and forth over the tube, compressing the metal against a mandrel which controls the inside diameter. This method—a complete departure from the cold-drawing process—permits tubing to be sized to closer tolerances. For example, 2″ O.D. Rockrite Tubing with .550″ wall thickness has less than one tenth the bore-tolerance of ordinary seamless steel tubing.

The Rockrite Process is adaptable to many grades and analyses of steel and other metals, including those which are difficult or impossible to cold-draw to size—and also to bi-metal tubing.

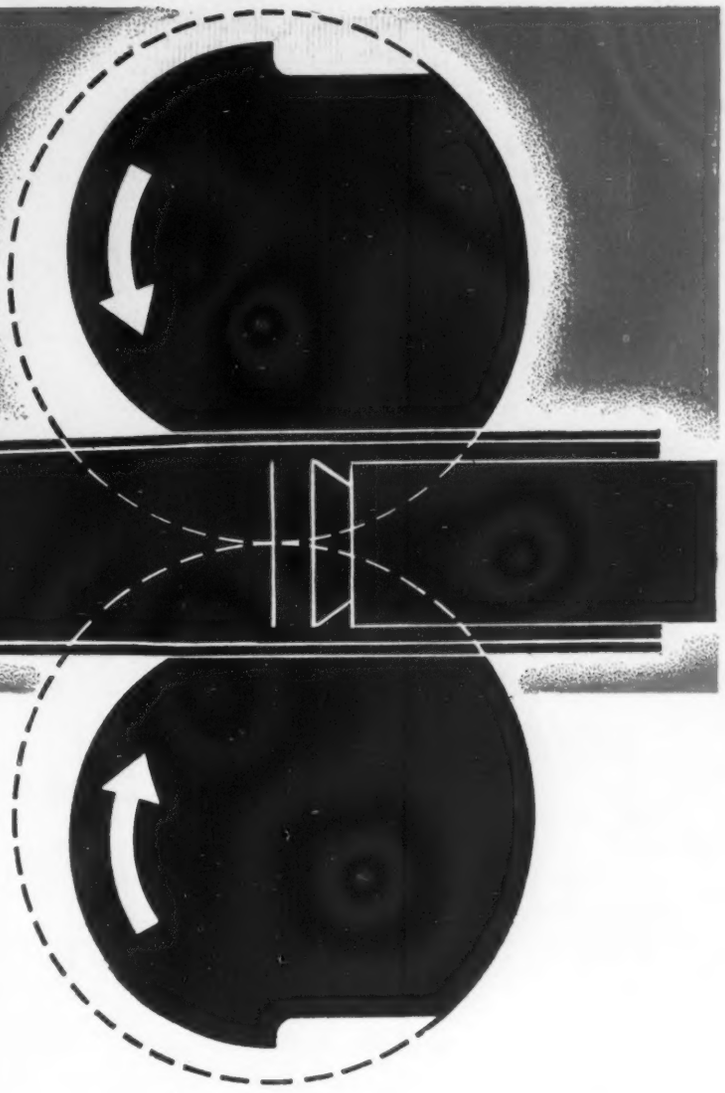
CONTROLLED CONCENTRICITY

In the Rockrite Process the tubing is sized by compression in progressive stages around the circumference of the tube. This causes the metal to flow *around* the tube as well as longitudinally, with a corrective action on any eccentricity or ovality that may be present in the tube before it is sized.

The greater concentricity and reduced ovality of Rockrite Tubing—particularly heavy-wall tubing—makes possible truly startling savings. In one plant the output of cylindrical parts was stepped



Pleases



up 60 per cent and the cost of machining cut in half when Rockrite Tubing was substituted for cold-drawn tube stock.

HIGH PHYSICALS

Working the metal by the Rockrite Process, as contrasted with stressing it in cold drawing, raises the physicals . . . and does it economically. For example, Rockrite Tubing of SAE X1020 can be produced without heat treatment, having 115,000 psi yield strength with 15 per cent elongation—and free machinability with these high physical properties. At the same time decarburization is minimized . . . worked down to such a thin layer as to be negligible.

You can get detailed information about Rockrite Close-Tolerance Tubing by sending for a 20-page descriptive bulletin which will be sent to engineers and executives who are interested in faster and more economical production of cylindrical or ring-shaped parts. Write today.

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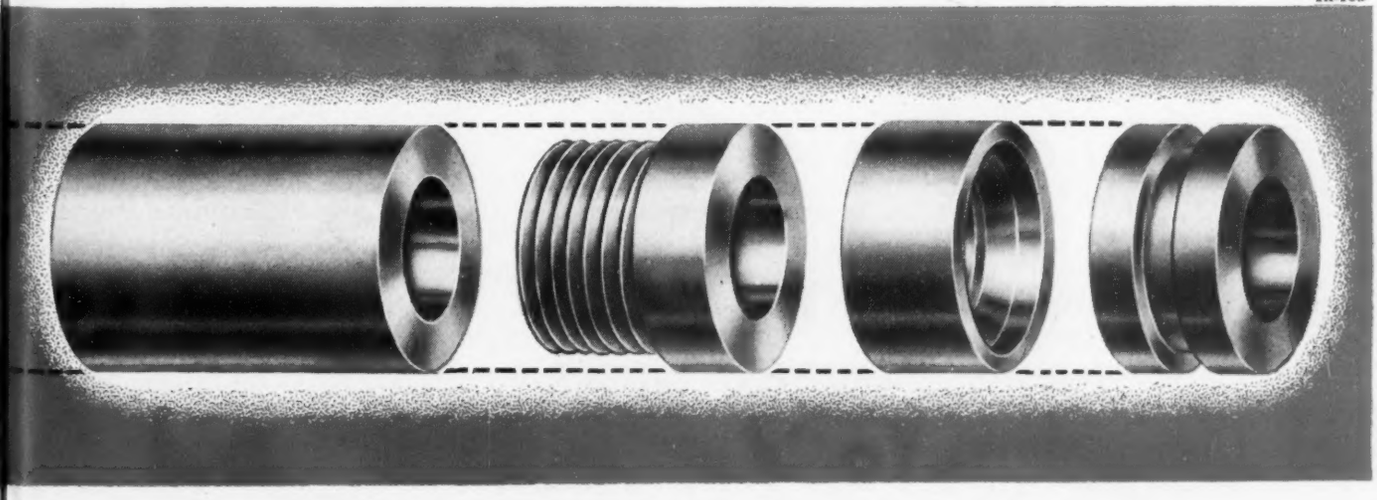

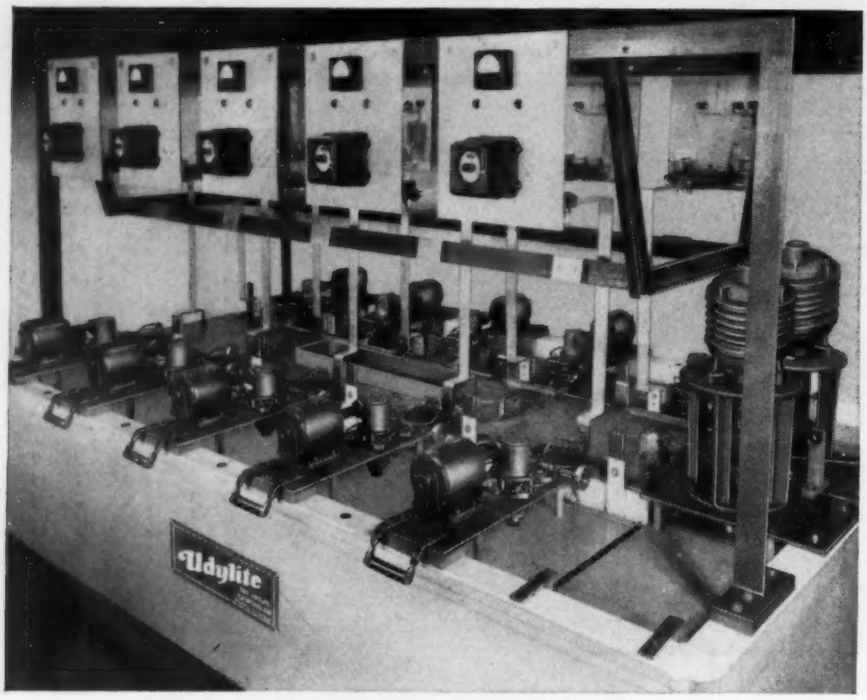

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emulsion coolants, which sometimes is overlooked or at least not given the full attention it deserves, is control of emulsion concentration. It must be remembered that every emulsion in use as a coolant for metalworking is undergoing a continual change in relative composition.

In some heavy duty cutting operations, the heat generated at the tool point evaporates the water at a rate faster than the carryoff rate of oil on the machined pieces. If allowed to progress, this change results in such a high ratio of oil-to-water that an inverted emulsion forms. This causes a loss of all coolant in the system and on top of this the further loss of down time on the machine for system cleaning and change of coolant.

In grinding operations the rate of oil carryoff is usually such that the emulsion concentration becomes increasingly leaner with service. The change may progress to a point where rusting and emulsion instability occur.

Since emulsions, as coolants, are usually prepared in the proper recommended concentration for given applications, it obviously is insufficient to merely add water or soluble oil or compound by rule of thumb to an operating system. It is wasteful of material and of potential production possibilities.

The wire drawing industry recognizes the importance of proper concentration control, since results, particularly on fine wire, are so dependent on such control. Fundamentally, all the control methods in the metalworking industry are based on two procedure steps. First, a sample of emulsion from the operating system is "broken," i.e. soap, fat, oil, pigment, etc., are separated from the water by addition to the sample of a suitable acid or salt. The proportion of "solids" to the volume of the whole sample is a measure of the concentration. Second, a calculation is made of the required amount of soluble oil, compound, or water it is necessary to add to the emulsion to restore the original recommended concentration.

The first step above may be made using some sort of graduated flask (see Fig. 2), an ordinary 100 cc measuring flask, a Babcock flask, or a Mighill flask can be used. Usually 5-10 cc of sulphuric or hydrochloric acid, or some acid salt such as potassium bisulphate crystals may be used as the "breaking" agent. Concentrated sulphuric acid is the most efficient agent. However, *extreme care* must be exercised to avoid spilling or splashing on the clothes or person. Painful, dangerous injury or damage to clothes can result from inexperienced use of sulphuric. Dilute hydrochloric is efficient, but a little slower in action. Po-

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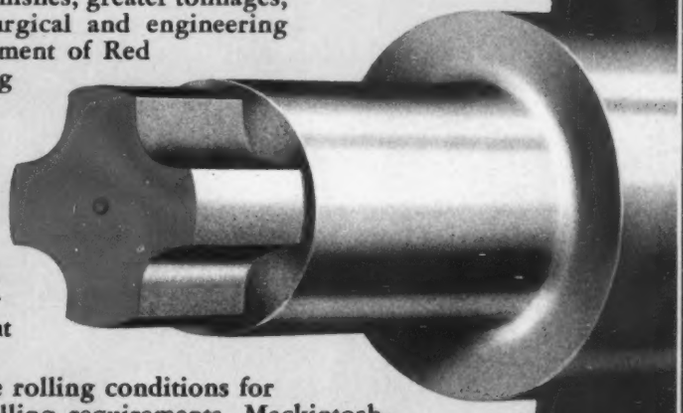

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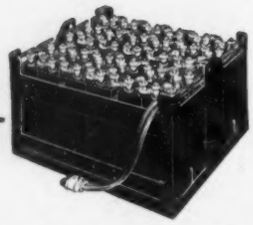

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Illustrated above is a material-handling job for which trucks must be kept on duty 24 hours a day, every working day. It is the kind of job in which battery industrial trucks excel because of their dependability and economy.

With batteries exchanged two or three times a day, the truck is kept continuously supplied with power. While one battery is being charged, another operates the truck.

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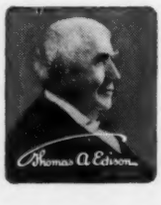
The truck starts instantly, accelerates smoothly; operates quietly; gives off no fumes; consumes no power during stops. Thus, it makes efficient use of power, and the current used for charging its batteries is the lowest-cost power available. Its electric-motor drives have a minimum of wearing parts and are inherently simple and trouble-free.

A battery industrial truck is most dependable and most economical when powered by EDISON Nickel-Iron-Alkaline Batteries. With steel cell construction, a solution that is a natural preservative of steel, and a fool-proof principle of operation, they are the most durable, longest lived, and most trouble-free of all types of batteries. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey. In Canada: International Equipment Company, Montreal and Toronto.*



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Adequate ductility for minor cold forming, such as bending or crimping

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tassium bisulphate crystals (about a teaspoonful added to 100 cc of emulsion) appear to be entirely adequate and are easy and relatively safe to handle.

Having measured the concentration of the sample by observing the volume of oil, fat, etc., which has risen in the neck of the flask to the surface of the water, the next step is determination of necessary addition of components to the system. This can be done, of course, arithmetically on paper. However, a new circular slide rule type calculator, shown in Fig. 1, is now available. This simplifies the procedure and prevents errors. It can be used by any intelligent shop man or machine operator, full, simple instructions being furnished. These calculators are available without charge from any industrial representative of the Shell Oil Co. The device has two sets of scales, one for determining enrichment, and one for dilution of the emulsion being checked.

Report States Heating Before Welding Effective

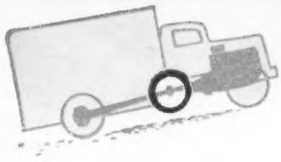
Heating steel plates to 400°F before welding has been found to be more effective in increasing the strength of welded hatch corner specimens than an 8 hour after-welding treatment at 1000° F. This fact, a result of research conducted at University of California for the Office of Scientific Research and Development and the U. S. Navy, is contained in a report for sale by the Office of Technical Services, Department of Commerce, Washington.

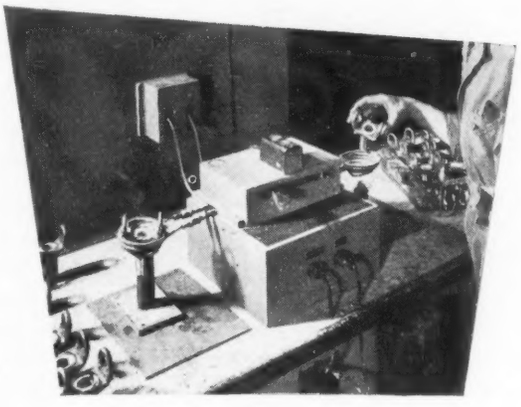
In all, 26 full size welded hatch corners like those used in ship construction were tested, each piece measuring 96 x 71 x 40 in. Results indicated that with high strength steels, such as those containing 3 1/3 per cent nickel, their full strength cannot be utilized because welded structures are so rigid that failure occurs in the welded joints because of lack of "give." The report concludes that performance of the welded joints must be improved in order to obtain maximum benefit from the higher strength steels.

Bulletin Describes Line of Electric Traveling Cranes

Built in a range of capacities of from 3 to 150 tons, the line of electric traveling cranes built by Victor R. Browning & Co. Inc., Willoughby, O., is described in a bulletin recently issued by that company. The liberally illustrated 28-page publication contains detailed information on the company's products.

Sections describing the bridge, rotating axle roller bearing end truck, center bridge drive, trolley, brakes, hook blocks, cage and motors are included.

IN METAL JOINTS  WHERE STAMINA IS VITAL



Cleaned yokes and sleeves come to the operator on a roller conveyer.. He applies Handy Flux, assembles parts and preplaces a 1⅜" dia. EASY-FLO ring made of 3/64" dia. wire in each assembly around the end of the sleeve. Heating is done with the 2-coil induction set-up above.. Time per part, 44 seconds. Loading one coil while the other is heating, keeps production moving in a steady stream.

RINGS OF EASY-FLO silver brazing alloy are being preplaced on the universal joint assemblies shown above preparatory to brazing the yokes to the sleeves ● ● ● With these simple EASY-FLO Rings plus an equally simple brazing procedure outlined at the left, New England Auto Products Co., Pottstown, Pa. puts many times the STAMINA required into their universal joints for cars, buses, trucks and farm units ● ● ● On the truck universals shown one operator turns out 655 perfectly brazed parts per 8 hour day—every one torque tested at 1540 lb.-ft., a test that far exceeds anything these joints will be called upon to take in service ● ● ● EASY-FLO gives rugged strength like this to hundreds of manufacturers in joining ferrous, non-ferrous and dissimilar metals. And, it gives this strong-as-the-metal-joined strength with surprising *speed* and *economy* ● ● ● Talk over *your* metal joining problems with one of our field engineers. Ask particularly about the new EASY-FLO 45. For complete details about all the advantages EASY-FLO offers, write for BULLETIN 12-A.

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Polishing and Lapping

(*Continued from Page 87*)

disk was used as the "lap" core and one layer of Owens-Corning Fiberglas ECC-11-112 was used as the nonconducting envelope.

The improved apparatus illustrated in Fig. 5 differs from that shown in Figs. 1, 4 and 10 in that the retaining ring projects above the upper surface of the disk. The ring thus serves the double purpose of holding the cloth on the disk and providing a dish for retention of electrolyte. Brass sheet, 0.020-in. thick, covered with Wraparax, a nonconducting, acid-proof tape made by Hanson, Van Winkle & Munning Co., Matawan, N. J., was used to construct the ring. The space between the ring and the disk was filled with Rackote acid-resistant lacquer, a product of Detroit Rackote Co., East Detroit, Mich., to prevent leakage of electrolyte from the surface of the disk.

Experiments were conducted to determine whether electrolytic lapping would be applicable and advantageous for general metallographic use. Specimens of a variety of alloys, see table, were prepared by belt sanding and polishing on grit number 1 emery paper before electrolytic lapping. Preliminary work was done, using the apparatus shown in Fig. 10, to determine which solutions were satisfactory for use on each alloy.

The solution which gave the best results was used to determine the optimum current density and duration of polishing. Since the ammeter readings were unsteady, reflecting sharp fluctuations in current, voltage rather than current density was used as the control.

Because the area of the specimens, the distance between electrodes and the resistance of the electrolyte were more or less constant for a given set of specimens, it was felt that voltage control was adequate. This was found to be true when the specimen was moved at the rate of about 50 rpm.

It was found, however, that the more rapid the motion of the specimen the higher the current density and the rate of scratch removal at a given voltage. Yet control of the rate of motion was not found necessary to obtain a mirror finish. Progress of scratch removal was observed visually during the operation and electrolytic lapping was terminated as soon as the last observed scratches had disappeared.

The specimen illustrated in Fig. 7 represents a transverse section of a pulled 70/30 brass tensile specimen taken near one of the gripped ends where the degree of cold working was relatively slight. The electrolytic method was found to be an effective time-saver. For example, the brush electrolytic polishing required about 1 min to polish the specimen shown.

In the case of the microstructure of the forged aluminum alloy shown in Fig. 9, again the clear structure was revealed by electrolytic polishing and with a considerable saving of time.

Results of Electrolytic Lapping: The results obtained in the study of optimum conditions for electrolytic lapping of various metals and alloys are shown in the table.

These results were determined not only on the basis of scratch removal but also on the quality of the finished photomicrographs. These results indicate that high quality metallographic polishing can be effected on the materials tested in a much shorter period of time than by mechanical polishing.

In addition, the electrolytic method does not introduce complications due to the cold working of metal during polishing. However, results to date show that the quality of the finish obtained by electrolytic lapping is seriously impaired by the presence of certain types of nonmetallic inclusions in the metals and alloys.

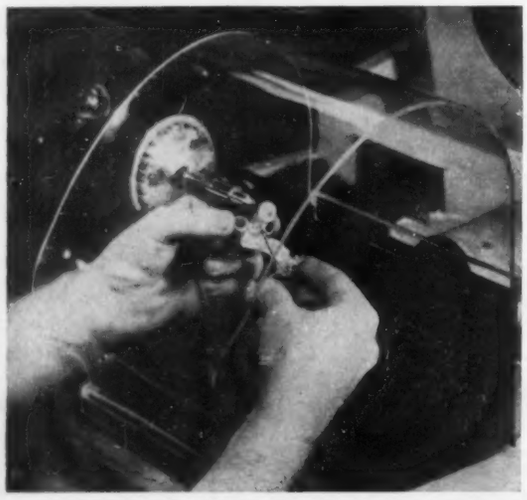
For example, Fig. 9 shows the exaggeration of copper oxide particles dispersed in copper rod whose structure was revealed by electrolytic polishing and etching. In the study of such a structure the conventional method of polishing is considered superior to electrolytic lapping. Further study will be necessary to determine whether all types of sonims, normally present in many metals and alloys, are equally detrimental to the results of electrolytic lapping. Studies of tank electropolishing indicate that the presence of sonims impose the greatest limitation of this method.

The current densities which effected the results shown in the table were of the order of 1000 to 1500 amp per sq ft of anode surface. It is undoubtedly the close proximity of anode and cathode which makes possible the attainment of such high current densities at relatively low voltages. The high current densities, in turn, account for the rapidity of the scratch-removal process.

When polishing copper or copper-base alloys in phosphoric acid-sulphuric acid mixtures a cathode deposit of pulverulent copper was found to build up between the warp and the filling of the glass cloth. A point was reached at which this deposit formed a bridge of metal between anode and cathode as was evidenced by sparking, "burnt" areas on the anode surface and a disproportionate rise in amperage. It was then found necessary to remove the glass cloth from the lapping disk, wash the cloth and the disk until free from cathode copper, then reassemble the apparatus for further use. The rapidity of build-up of the cathode deposit depends entirely on the amount of work accomplished as indicated by the number of ampere-hours expended.

Practical Applications: Use of the brush method is indicated wherever it is necessary to polish discrete areas of massive objects or portions of intricately shaped objects which are inaccessible to buffs or polishing wheels. Brushes can be designed to accommodate various sizes and shapes. If it is necessary to examine with a portable microscope the microstructure of a portion of a bulky structure, the brush may be used both for electrolytic polishing and electrolytic etching of a large number of metals and alloys.

It remains for future experiments to determine the full sphere of usefulness of both brush electrolytic polishing and electrolytic lapping.



EYE PROTECTION: This tough, transparent Plexiglas guard simultaneously protects workers' eyes from flying metal particles and provides for the efficient recovery of gold particles or "sweeps" in the production of dental appliances. Called the Gold Digger, the device is made by Fabriform, Byesville, O., and was introduced by Dilley Mfg. Co., Cleveland. Photo courtesy Rohm & Haas Co.

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This FHP Motor Armature Shaft is one of the many parts made on Greenlee Automatics at Jack & Heintz Precision Industries, Inc., Cleveland, Ohio. The production rate is 100 per hour per machine. Stock: SAE X-1335 CRS, 13/16" bar diameter, overall length 9-29/32". Other parts produced are bearing races, magneto rotor shafts, and aircraft accessory parts.

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Spot Welding

(*Concluded from Page* 88)

usually the adjoining metal, not the weld, that breaks. Surface-resistance and shear tests satisfactory, fabrication can begin. Rigid inspection is still the rule, both during and after welding. Each part is carefully inspected for scratches, burns or other defects. Pieces to be welded are placed between two copper electrodes and a current of electricity is turned on. First step in a typical spot welding operation is to apply heavy pressure between the copper electrodes, squeezing the parts together. Then this pressure is eased to about half its initial value. A heavy current at low voltage—6 v with electrodes apart, practically nil under pressure, is then passed through electrodes and material and again the heavy pressure is applied.

Standard size press welder accommodates aluminum up to 36 in. wide and welds two sheets of 0.081-in. Large press welders, while not able to weld sheets of thicker gage than the standard machine, will accommodate sheets up to 60 in. wide. These machines are used primarily to weld stiffeners to the skin.

Some of the spot welding machines in the plant utilize copper rollers for electrodes and between them huge pieces of aluminum are passed. A mechanical arrangement halts the movement regularly and in this brief moment a spot weld is made. The welders are strangely suggestive of the early airplane days when steel needle and stout linen thread were prime tools of the industry. Today the needles are copper rollers and the stout thread is an electric current.

The roll-welder will take sheets up to 52-in. wide and is used to weld patches to skin panels for window reinforcing. The heavy duty press has a throat of 47 in. and can weld two pieces of 0.188-in. aluminum.

—o—

A complete mine conveyor of the internal takeup type was exhibited in operation by Robins Conveyors division of Hewitt-Robins Inc., Passaic, N. J., at the American Mining Congress 1947 coal convention and exposition in Cleveland, May 12 through 15. The conveyor was equipped with Hewitt Ajax mine conveyor belting.

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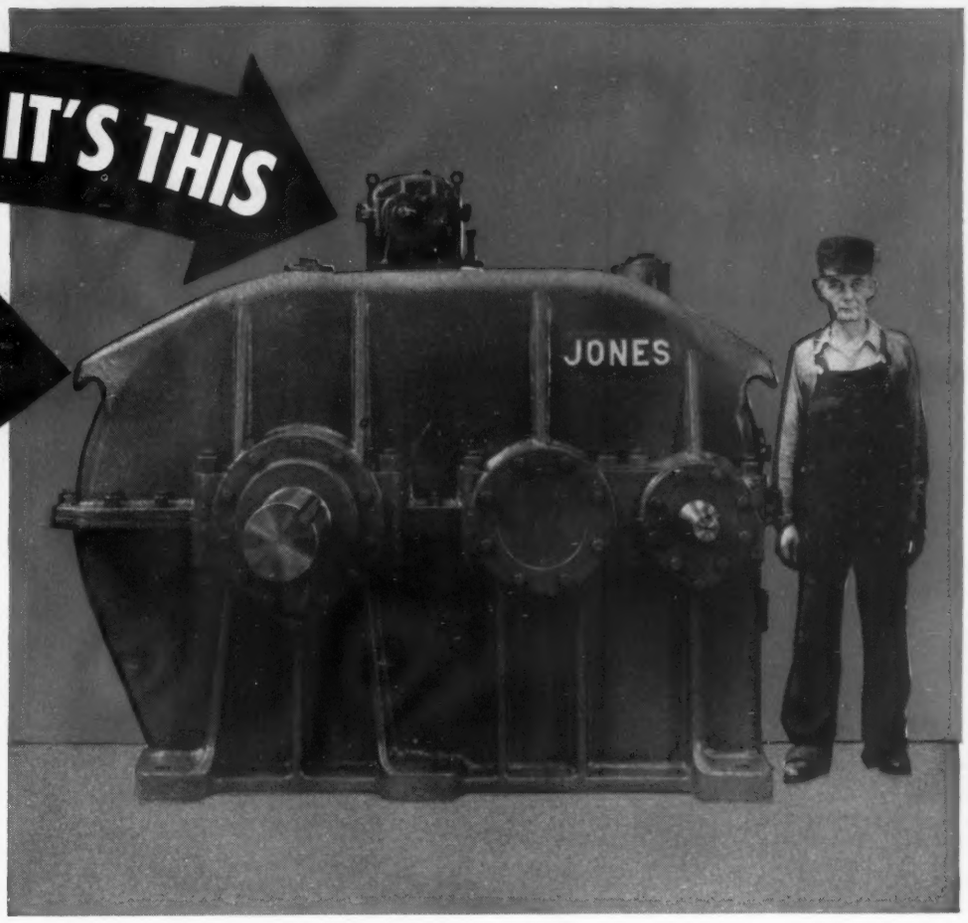
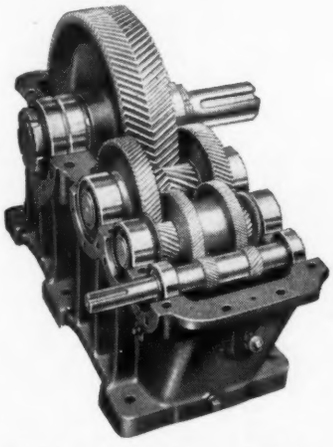


. . . both are designed and constructed to give satisfactory service and long life



The above view of a Jones Triple Reduction Herringbone Speed Reducer is typical of a line that is noted for advanced design, superior materials, precision workmanship.

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With this conservative rating policy goes sturdiness, compactness, symmetry and balance—all factors that influence maximum efficiency, long life and improved performance.

Jones Herringbone Gear Speed Reducers are built in a wide range of ratios and ratings to cover every requirement. Single (Type SH) reducers in standard ratios range from 1.25 to 1 up to 11 to 1 in ratings from 1.3 to 440 H.P. Double (Type DH) reducers are built in standard ratios from 10.9 to 1 up to 72 to 1 in ratings from 0.5 to 275 H.P. The triple reduction reducers (Type TH) cover a range of ratios from 86.9 to 1 up to 355.8 to 1 in ratings from 0.3 to 78 H.P.

All these reducers have heat treated gears, ground shafts and are mounted with anti-friction bearings throughout. Cast iron bases are available for all variations of motor assembly.

For complete information on both standard and special applications of Jones Herringbone Reducers ask for Catalog No. 70. This 128 page catalog is a comprehensive technical treatise on the whole subject of Herringbone Reducer application for all conditions of service. If you have any type of drive problem that might call for Herringbone gears we shall be pleased to send you a copy.

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Use of Files

(*Continued from Page* 92)

(3) lathe filing, stroking the file against the work revolved in a lathe.

Filing Technique: When work is held in a vise, as most work is held, the vise should be about elbow height for general filing. Work should be held slightly lower for heavy filing and should be raised to about eye-level for fine, precision finish filing. Parts liable to damage by vise pressure should be provided with protectors, pieces of copper, zinc or other moderately soft metal, placed between the vise jaws and work. Blocks of hard, close-grained wood with varying sizes of mating grooves are used for holding round pieces such as small rods and pins. Files designed for operation with both hands are usually grasped at the point by thumb and first two fingers of the left hand (right-handed person), the hand being so held as to bring the thumb—as its ball presses upon the top of the file—in line with the handle when heavy strokes are required. A generally accepted manner of grasping the handle is to allow its end to fit into, and bring up against, the fleshy part of the right palm below the joint of the little finger, the thumb lying parallel along top of the handle and fingers pointing upward toward the operator's face.

With a light stroke—and as pressure required becomes less—thumb and fingers of the "point-holding" hand may change direction until the thumb lies nearly at right angles with the length of the file, positions shifting slightly as needed to increase downward pressure. When holding the file with one hand for filing pins, edged tools and dies not held in a vise, the forefinger, instead of thumb, is usually placed on top, as nearly as possible in direction of its length.

Most natural stroke movement for the uninitiated is to "carry" a file across work in curved lines. The resulting rocking motion generates a convex surface where a level one is desired. For most flat filing, operators should, therefore, carry the file forward in nearly a straight line, changing its course only enough to prevent grooving. Too much or too little on the forward stroke damages cutting qualities.

Different materials require varying pressures, but a sensible rule is to apply sufficient pressure to keep the file cutting at all times. Teeth soon become dull if allowed to "slide" over harder metals and they become clogged with chips if too much pressure is applied. Except on very soft metals, the file is lifted from work on the reverse stroke; even on soft metals these pressures on the back stroke should be limited to the weight of the file only.

Correct drawfiling produces a somewhat finer finish than straight filing, but since these tools are primarily designed to cut on a longitudinal forward stroke, a file with a short-angle cut should never be used due to likelihood of scratching or scoring instead of shearing or shaving. In drawfiling, the tool is grasped firmly at each end and alternately pushed and pulled sidewise across the work.

Drawfiling is extensively practiced by file manufacturers themselves in preparing blanks. It produces a smooth, level surface conducive to subsequent uniform tooth cutting. Standard mill bastard files are ordinarily employed for drawfiling, but a double-cut flat or hand file will work faster where a considerable amount of stock is to be removed, as on metal sheet and plate edges. The double-cut file, however, tends to leave small ridges. In other words, it does not produce the smooth surface oftentimes required. Hence, when a double-cut is used for roughing down it frequently is followed by a single-cut mill file to give desired finish.

Lathe filing is common practice when fitting shafts. The file should be stroked constantly against work revolving in a lathe, not held rigid or stationary. Also slight lateral gliding motion aids in clearance of chips and avoids ridges or scores. There are special long-angle lathe files with teeth cut at a much longer angle than those on a standard mill file, but for much work latter type produces good lathe filing results, Fig. 10. Longer angle files tend to give cleaner shearing, reduction of clogging by self-clearance of chips, elimination of drag or tear and elimination of chatter.

Uncut edges on the long-angle file protect work shoulders which are not to be filed. Also, they prevent filing damage to chuck jaws which revolve the work. This type of file not only is fast-cutting, but also with a delicate touch gives a fine, smooth finish.

Highest ordinary lathe spindle speeds are satisfactory for file fitting shafts. Where amount of stock to be removed is considerable, a long-angle 12 or 14-in. lathe file is extensively used to bring a shaft down to drive fit. For a running fit, that is on a shaft to run a bearing, a mill file will provide necessary smooth finish. For a highly polished finish, a Swiss pattern hand or pillar file, No. 4 or 6 cut, meets requirements. To insure a very smooth surface, a new file frequently is run over a flat piece of cast iron before lathe filing. This is to remove the extreme sharpness (feather edges) from the top of the teeth.

For oval, elliptical and irregular rounded surfaces, finer, lighter cutting Swiss

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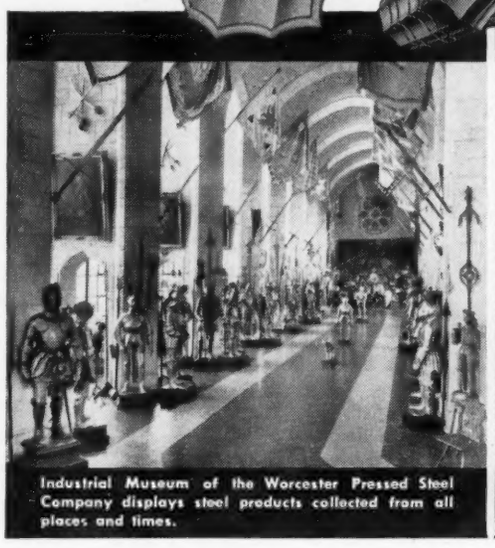
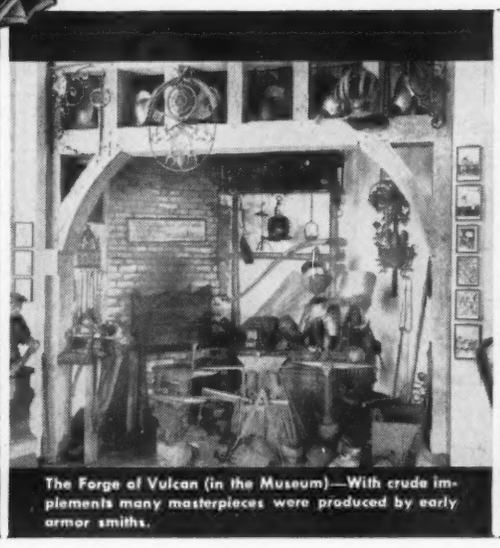
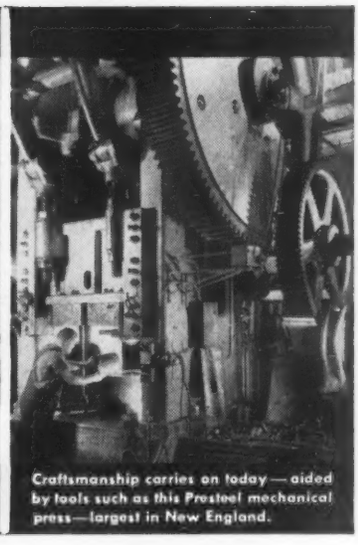


Industrial Museum of the Worcester Pressed Steel Company displays steel products collected from all places and times.



The Forge of Vulcan (in the Museum)—With crude implements many masterpieces were produced by early armor smiths.



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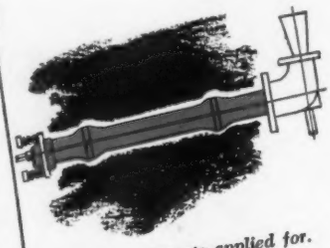

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- Operation up to 2800° F.
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pattern files are most satisfactory, there being a wide range of shapes, sizes and cuts.

Care must be exercised at shaft ends and shoulders when using long-angle lathe files. These fast-cutting tools may easily cut in too deep at such points. When lathe filing, the hand should never be run over the work. Accumulated oil and moisture from the hand will coat the work surface, even a thin film making it difficult for the file to "take hold" when next stroked.

Since there are literally thousands of files available, it follows that there is a specific reason for their production and use in particular sizes, cuts, shapes and design. Bear in mind that, broadly speaking, all files are special purpose tools. As matter of metal removal becomes more specific, selection of the right file to do a job becomes equally exacting. Elemental considerations call for deep-biting double-cut flat or hand files for fast stock removal and for single-cut mill files for smooth finish and edge-tool sharpening. As jobs become more intricate—for example, keyways, slots, narrow surfaces and sharp angles—skilled use of pillar, square, three square or warding, knife and various other shapes, is required.

Developments in metals and alloys on a production basis are soon paralleled by new file designs whose cuts and other characteristics meet the new and special conditions created. Thus utilization of this "ancient and honorable" metal-removing tool in special purpose fields is constantly expanding.

In this category are special foundry files for snagging castings, removing fins, sprues and projections, this being unduly rough, heavy work for ordinary files. For such work, teeth are made sturdier, with thick, heavy-set edges to resist "shelling" or breaking out. On rough castings only a few teeth are engaged at any one time, thus putting a severe strain on each individual tooth. Ordinary cut files lack the necessary ruggedness. Foundry files also are used in filing sharp corners of dies. On rough castings these foundry files do not have the cutting speed of ordinary files, but they do have much longer useful life on this kind of work.

(To be concluded next week)

—o—

In the absence of active opposition, the recommended commercial standard for sine bars, blocks, plates and fixtures circulated in January of this year, may be considered effective as a voluntary standard of trade as of Aug. 15, 1947, states the National Bureau of Standards of the Department of Commerce.

The standard, identified as CS141-47, was accepted recently by a number of users, manufacturers and distributors.

Oxygen Enriched Blast

(*Concluded from Page* 112)

gen enriched blast in this country are doubtful. We know we are not interested in portland cement. Production of cement in the blast furnace would disregard one of the fundamentals of engineering: namely, that we never should try to make one piece of equipment do two jobs not related to each other. Advantages for the production of ferroalloys appear to be tempting. The stoveless furnace being regulated by changing the oxygen in the blast probably is far off and might never come. And there probably is no reason for visions as Shapovalov expressed them back in 1938: "The combination of the blast furnace process based on oxygen-enriched blast with other branches of industry, such as aluminum, cement, chemical, etc. opens up to our national economy immense new perspectives."

Paper presented before the Blast Furnace and Coke Association, Chicago district, Del Prado hotel, Chicago, Jan. 31, 1947.

REFERENCES

[1] W. Lennings: "Use of Oxygen-Enriched Air in the Blast Furnace". *Stahl und Eisen* 55 (1935), pp. 533-544 and 565-572.

[2] W. Lennings: "Tests with Oxygen-Enriched Blast on Rich and Lean Ore Burdens". *Stahl und Eisen* 63 (1943), pp. 757-767.

[3] M. A. Shapovalov: "Working of the Blast Furnace on Oxygen Enriched Blast." *Kislorod* 1944, pp. 17-31.

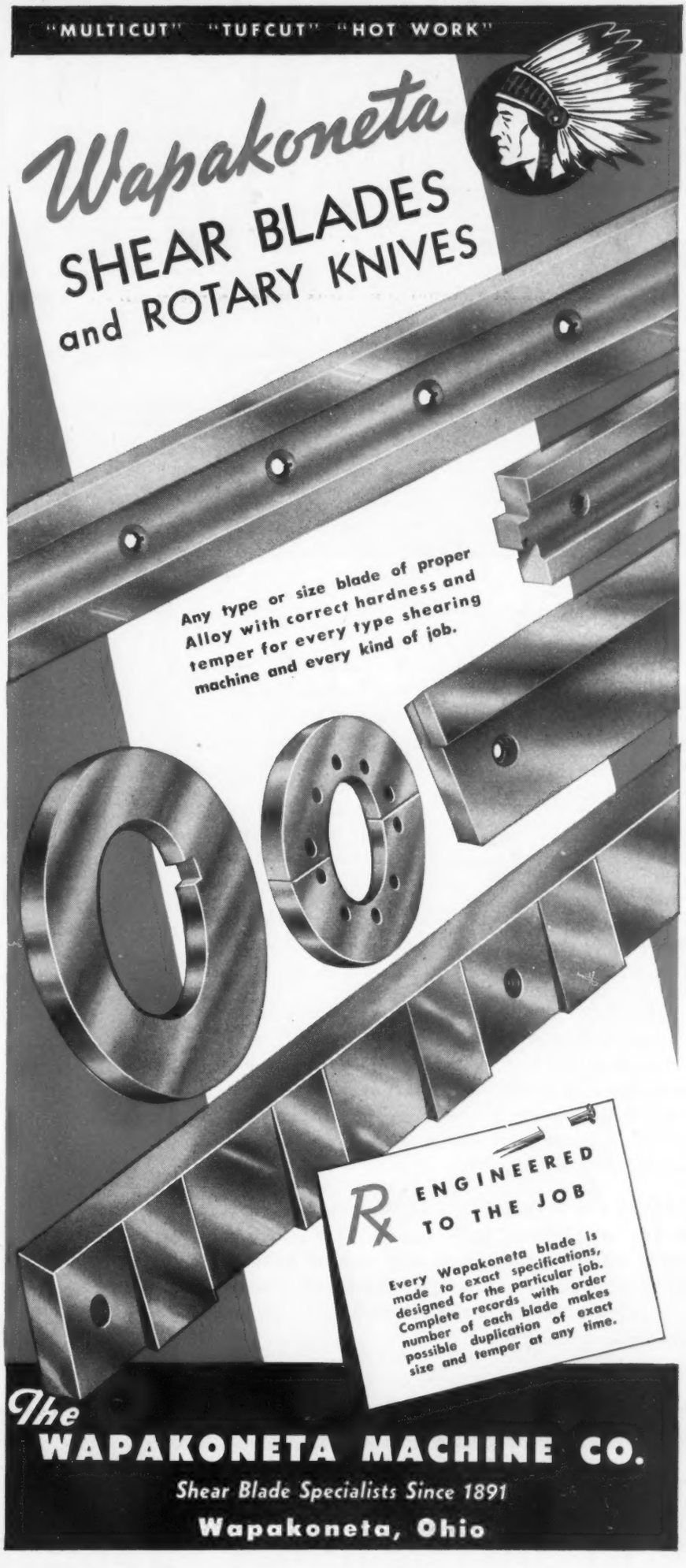
Automatic Arc Welding Increases Plow Production

An increase in the production of plow points was brought about recently by the installation of an automatic metallic arc welder in the Louisville plant of Brinly-Hardy Co. Although using one less man, production has been increased to 100 points per hour using a Lincolnweld unit furnished by Lincoln Electric Co., Cleveland.

Further economies realized include elimination of the fitting and polishing necessitated by heavy scaling as a result of the former welding method. Said to be more durable when welded by the new method, the plow points manufactured by this process now number more than 40,000.

—o—

A small oilproof track-type switch designed for machine tool or similar applications is being manufactured by General Electric Co., Schenectady 5, N. Y. It can be used in a variety of operations through the use of interchangeable operating heads for roller-lever, roller-push-rod, push-rod, or plunger operation. Switch embodies a single-pole, double-throw, self-contained, snap-action control.


"MULTICUT" "TUFCUT" "HOT WORK"
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SHEAR BLADES
and ROTARY KNIVES
Any type or size blade of proper Alloy with correct hardness and temper for every type shearing machine and every kind of job.
Rx ENGINEERED TO THE JOB
Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.
The WAPAKONETA MACHINE CO.
Shear Blade Specialists Since 1891
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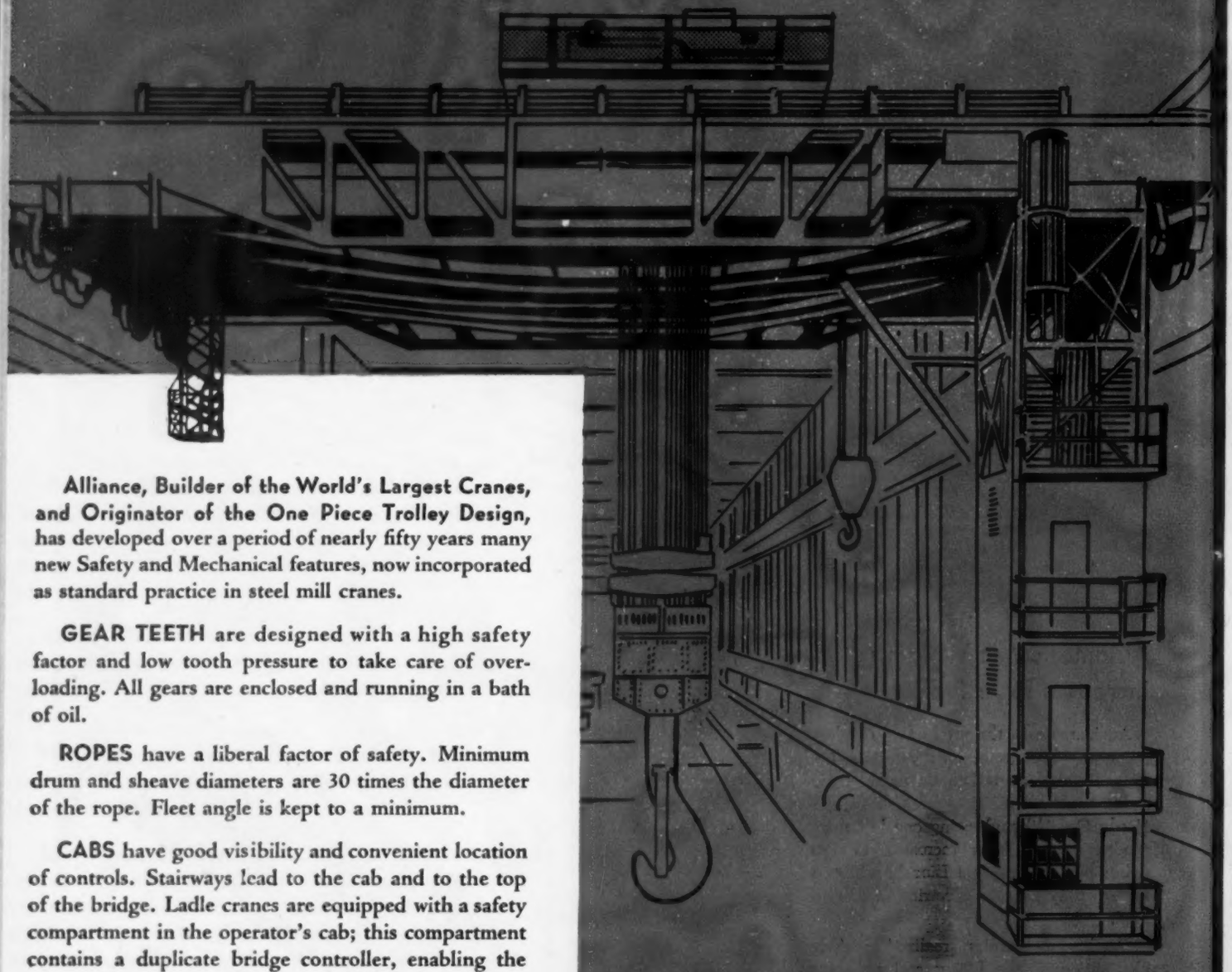
Alliance Builds Cranes

BIGGER and BETTER



Alliance, Builder of the World's Largest Cranes, and Originator of the One Piece Trolley Design, has developed over a period of nearly fifty years many new Safety and Mechanical features, now incorporated as standard practice in steel mill cranes.

GEAR TEETH are designed with a high safety factor and low tooth pressure to take care of overloading. All gears are enclosed and running in a bath of oil.

ROPES have a liberal factor of safety. Minimum drum and sheave diameters are 30 times the diameter of the rope. Fleet angle is kept to a minimum.

CABS have good visibility and convenient location of controls. Stairways lead to the cab and to the top of the bridge. Ladle cranes are equipped with a safety compartment in the operator's cab; this compartment contains a duplicate bridge controller, enabling the operator to move the crane in safety in case of accidental spilling of hot metal.

FOUR MAIN HOISTING ROPES, not one, carry the load on Alliance Ladle Cranes. This patented safety rope reeving combined with another Alliance development, (the laminated plate ladle hook), make up a safety team that is the acknowledged *tops* for safe handling of hot metal.

Rely on Alliance for

LADLE CRANES · GANTRY CRANES · FORGING MANIPULATORS
SOAKING PIT CRANES · OPEN HEARTH CHARGING MACHINES
STRIPPER CRANES · SLAB AND BILLET CHARGING MACHINES
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Alliance

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 138

1. Bench Filer

Universal joint clamp which assures a 100 per cent vertical file position despite warped or twisted file shanks is incorporated into the model FH-10 bench filing machine for filing, sawing and honing operations, made by DoAll Co., Des Plaines, Ill. An overarm backup

roller gives support to the tool. The tilting table measures 10 3/8-in. square.

The machine has a 1 1/2-in. stroke and a file shank capacity of 1/8 to 3/8-in. Tools are actuated by a scotch yoke mechanism running in an oil bath. Vertical shaft bearings are adjusted by locking thumb screws on outside of housings. Unit is powered by a ¼-hp 110 v, 1724 rpm motor that provides approximately 350 strokes per minute. An illuminated magnifying attachment is available with unit.

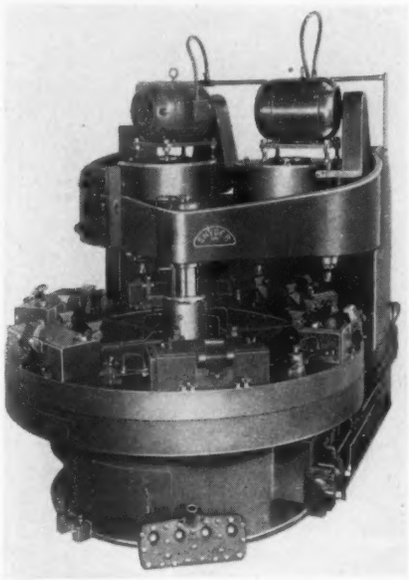
2. Tilting Platform Truck

Designed for easier manipulation of massive machinery and crates, into carrying position, a new gravity tilting platform type electric truck introduced by Yale & Towne Mfg. Co., 405 Lexington avenue, New York 17, accomplishes this by means of an integral roller ram and cable draw system. Roller platform falls into ramp position when unlatched by operator, and winch-drawn cables encircle the load to pull it onto the ramp causing the ramp to rock back into the horizontal transporting position.

Three pulling levels for the cable lines may be used, the lowest being direct from the cable drum (for dense and low loads such as steel plate). The higher idler sheaves are employed to obtain high purchases on such loads as machinery and bulky crates. Drive and control equipment are designed on the extra heavy side. All six wheels of the truck are actuated by shockless worm-wheel steer.

3. Special Purpose Miller

Cylinder heads are milled two at a time on an automatic special machine developed by Snyder Tool & Engineering Co., Detroit. Two loaded fixtures index automatically under dual spindle



milling heads that feed cutters across the two bosses on each work piece. Cutters then rotate about a common center and mill remaining two bosses on each piece.

Upon completion of milling cycle, cutters swivel rapidly to start position and machine table indexes for unloading. Equalizing locators on the fixture assure uniform dome thickness after subsequent milling operations.

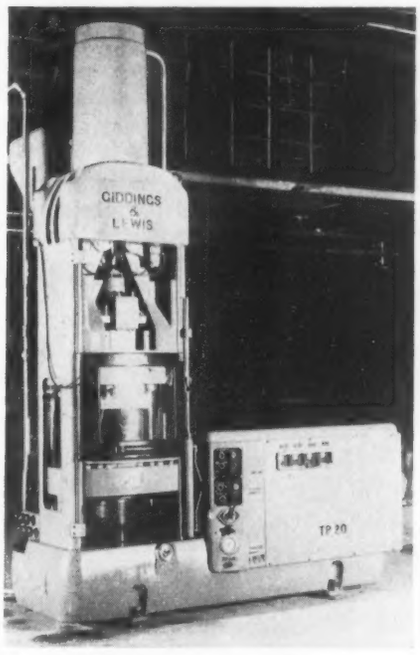
4. Drill Head

Eight spindles, mounted on oilite bearings and heavy duty ball thrust bearings, and which may be adjusted to a minimum distance between spindles of 11/16-in. to anywhere in an area of a 6 in. diameter circle, comprise the adjustable spindle drill head introduced by U. S. Drill Head Co., 1960 River road, Cincinnati. Head is suitable for mounting on any sensitive drilling machine.

Universal joints used in the head are self-lubricated. A bracket and guide bar can be furnished to clamp on column of machine to remove backlash in quill of drilling machine. Head casting is aluminum alloy. Gears are of alloy steel and are of subteeth helical type. Spindles rotate in same direction as drive shaft of machine. Standard spindles are equipped with collets that will take up to 1/4-in. diameter shanks.

5. Plastic Press

Vertical construction incorporating the use of a single hydraulic cylinder characterizes the new vertical plastics injection press announced by Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. Structural advantage of this arrangement provides for clamping the



mold halves together and injecting the plastic material into the mold cavity in the same stroke of the piston rod.

Insert molding is simplified because the vertical construction of the press prevents possible mold damage as inserts are held in place by gravity. Machine provides for simplified quick changing of heating cylinders, making it possible to have heating cylinders for different plastic materials and colors.

All units of press are easily accessible. Controls may be set for manual, semi-

automatic or automatic operation. Interlocked circuits provide safety precautions.

6. Portable Air Compressor

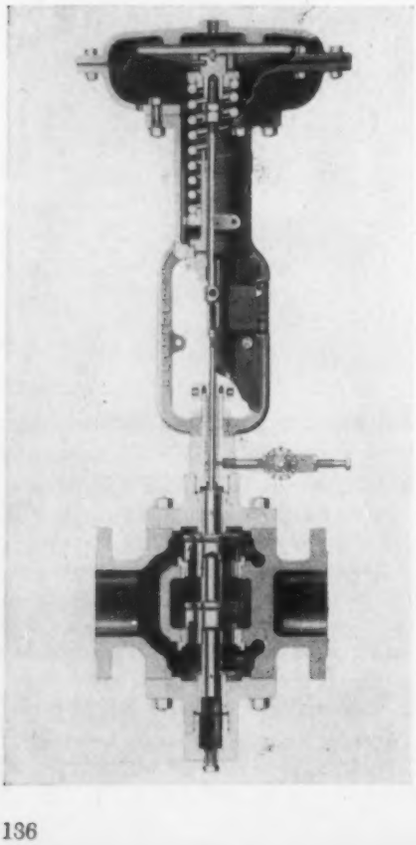
Production of a double V-type 160 cu ft portable air compressor available in skid, steel wheel trailer and pneumatic tired trailer mounting styles is announced by Davey Compressor Co., Kent, O. Unit has three low pressure cylinders and one high pressure cylinder, all with a 5 3/4-in. bore and a 4 in. stroke. Gasoline powered units are driven by a Hercules JXD engine.

Compressors have aluminum alloy heads for rapid heat dissipation and aluminum crankcase for cooling of lubricating oil and weight saving. Low pressure cylinders have individual air cleaners which provide cylinder and head cooling during idling periods. Unit is designated as model 160 Air Chief.

7. Diaphragm Valve

Equipped with a reinforced molded Neoprene diaphragm designed to respond to the slightest change in signal air pressure, the No. 700 air-operated diaphragm motor control valve, manufactured by H. Belfield Co., Broad street at Hamilton, Philadelphia 23, transmits the diaphragm force from the inner plate to the stem of the superstructure by means of a ball pivot.

Valves are available with radiation fins for heat dissipation under certain conditions, with pneumatic positioner for overcoming large and varying stem thrusts, supersensitive controller, venturi throat control valve, three-way control valve and various other styles. They are made in a wide range of sizes and materials for handling various liquids. Springs are available for standard ranges of 2 to 14, 0 to 7 and 7 to 14 psi of signal air pressure.



8. Hopper Feeder

Fully automatic, self-contained hopper feeding unit which eliminates hand-feeding operations and operates with a minimum of adjustment, is offered by Feedall Machine & Engineering Co., 70 Vine street, Willoughby, O. It may be attached

to a wide variety of high production machines and is capable of feeding cylindrical work to 1 1/4-in. in diameter to 6 in. in length.

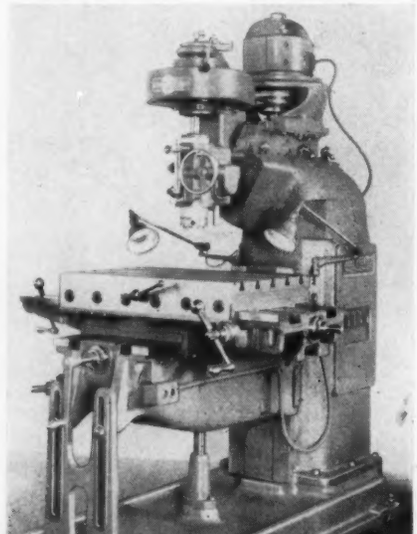
Machine is powered by a 1/2-hp motor coupled to a variable speed V-belt drive which is adjusted while the machine is running. It can be used with centerless grinders, double end grinders, automatic screw machines and drilling machines, among others. Feed consists of an oscillating pick-up blade which passes through the bowl and picks up work in the slot and deposits it in the chute.

9. Small Electric Motor

General purpose universal electric motor, rated a 1/10 hp at 5000 rpm, is offered by L & R Mfg. Co., 577 Elm street, Arlington, N. J. Designed for alternating or direct current operation, motor features a spindle with a 3/8-in. shaft extending in both directions and double shielded ball bearings that never require oiling. Outside diameter of the motor is 3 1/4-in. It is mounted on a pedestal and is supplied with a 3-step pulley, foot rheostat and reversing switch.

10. Vertical Milling Unit

High speed milling, routing and die sinking work are possible with the heavy duty milling machine announced by



Reed-Prentice Corp., Worcester 4, Mass. It has a head mounted on a horizontal ram for wider range forward and back, and rigid spindle construction, supported at top by precision ball bearings and at bottom by double row roller bearings.

Extreme rigidity of head and spindle construction permits use of large diameter or two lip cutters. Roller bearings on table and saddle permit easy movement. Machine's table measures 32 x 22 in. and throat depth is 30 in. Machine is powered by a 3 hp, 1200 rpm motor. Drive to spindle is by V-belt. Both pulleys are 4 step. Ten speeds are obtainable with open belt in range of 400 to 2600 rpm and five with back gears in range of 133 to 320 rpm.

11. Portable Elevator

Manufactured by Revolvator Co., North Bergen, N. J., a new lightweight portable elevator will handle a large variety of commodities weighing up to 1/2-ton. Exceptionally maneuverable, the elevator will negotiate narrow aisles. Its platform is 22 x 24 in. and its overall height for clearing average doorways is 68 in. Lift is 55 in.

Unit is equipped with a floor lock and swivel casters on the hoist end. Crank-up, crank-down hoist allows no gravity drop. The end of the cable is readily placed on top of the machine for two-part arrangement, or directly on

the platform for more quickly elevating half the load. Cable may be wrapped around a box or other commodity for dragging by the hoist.

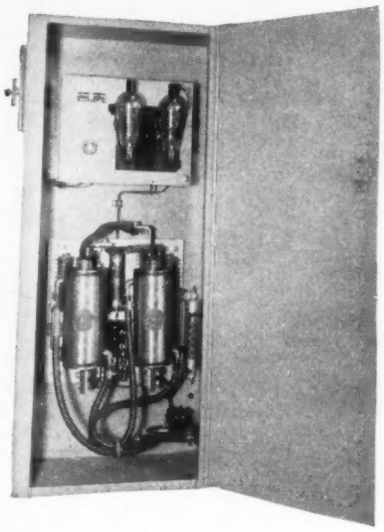
12. Safety Overload Link

Dayton Rogers Mfg. Co., Minneapolis, reports a new model HP safety overload connecting link, suitable for all punch presses. It is designed to give the necessary tonnage protection within the maximum tonnage capacity of the punch press.

Link not only protects the crank and press frame, but also may be arranged to protect any of the tools used in the press. It also compensates for stock thickness variation, or the insertion of two blanks on a forming die on operations such as forming, pressing, riveting, briqueting, assembling, etc. It is easily installed and is being produced in sizes for press capacities of 37 to 250 tons.

13. Welding Controls

A line of nonsynchronous electronic resistance welding control combinations is announced by General Electric Co., Schenectady, N. Y. Designed to meet new NEMA standards for resistance



welding controls, the line includes combinations of ignitron contactors and sequence-weld timers, with or without electronic heat control, all mounted in a single cabinet.

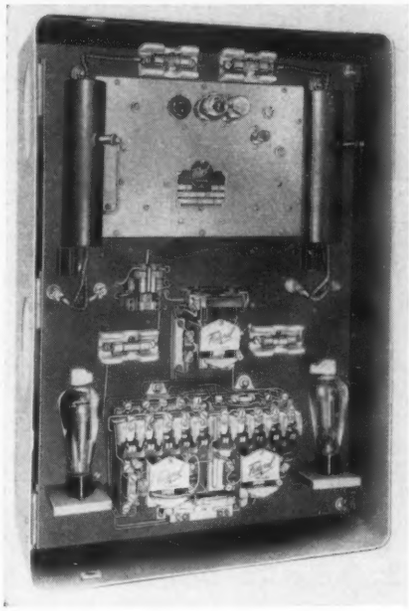
Although designed for mounting on the right-hand side of the welding machine, each control can be placed on the floor alongside the machine or mounted on a wall or balcony. By adding extension cable the control station may be mounted at the machine while the main control panel is located remotely.

The timing or front portion of the sequence-weld timer may be removed for servicing in a few seconds. The back panel of the timer, control station, or electronic heat control panel can be quickly removed for replacement.

14. Electronic Motor Control

Operation of direct current motors from alternating current power is possible with the two electronic motor controls announced by Federal Electric Products Co., Newark, N. J. One model is a general purpose, reversing type applied to a 2 hp, 230 v dc motor, and second is a special control for an abrasive M-3 surface grinder.

Electronic control has demonstrated that it can closely regulate motor speed



to provide an almost flat speed torque curve with changes in load having little effect on speed. Precise automatic current limiting makes it possible to preset the maximum allowable armature current. Smooth, stepless acceleration from standstill is possible without drawing excessive current from the line.

15. Die Sets

Low shut height (3¼-in.) interchangeable self stripping punch and die units capable of operating in the smallest press

FOR MORE INFORMATION
on products and equipment described in this section, fill in a card following page 138.

equipment are announced by Raar Mfg. Co., 1663 North Highland, Los Angeles 28. Other features are air slug ejection, closer hole centers, simplicity of construction (six parts), wide range of hole sizes (1/32 to 1 1/32-in.) and simplified mounting requiring only two screws.

Change or replacement of punch and die units is easily accomplished because stripper and stripper guide are removable by a one-half turn. Changes may be accomplished without disturbing the set-up. Without retainer, the stepped die construction and height in conjunction with standard die steels is especially designed for use in cut-off, notching, blanking and other press operations.

16. Pump Stroke Adjustment

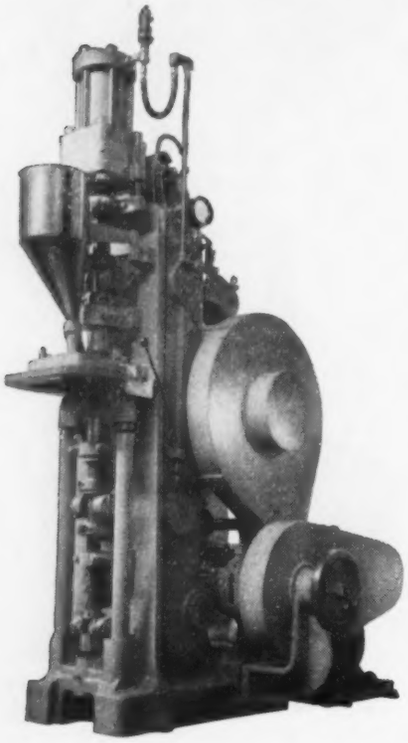
Pump volume may be regulated while the pump is in operation with the stroke adjustment developed by Milton Roy Co., 1308 East Mermaid avenue, Philadelphia 18. Micro-indicating adjustment provides precise control of plunger stroke by means of a hand wheel. Vernier dial permits quick resetting to any stroke length to within one 750th of full length of the full stroke.

17. Powder Metal Press

Demand for greater pressures and higher production in compacting a wide range of powdered metals parts is met by the S-3 cam type press of 40-ton capacity, offered by F. J. Stokes Machine Co., Philadelphia 20. Operating at 30 strokes per minute, it is fully automatic and equipped with a compound lower punch that operates either as a secondary lower punch or as a movable core rod.

Die table can take the full pressure applied by the upper punch which is designed to stay out of the way during

more than 110 degrees of the cycle before descending rapidly and then slowly compressing the metal powder. This facilitates feeding of difficult materials.



Maximum die fill is 6¼-in. and maximum diameter of piece that can be formed is 3 in. Alignment is to within 0.001-in. in the several planes involved.

18. Rust Preventive

Drying within six hours, Y-600 rust preventive, a product of Yosemite Chemical Co., 1040 Mariposa street, San Francisco 10, may be sprayed, dipped, painted or sponged onto metal surfaces which are dry or wet. Resulting film is microscopically thin and is physically combined with and bonded to the metal. Equally effective for preventing corrosion and stain on nonferrous metals, film is not affected by high humidity and high machine temperatures.

19. Steel Strapping

Steel strapping capable of forming itself easily around all objects, yet possessing good tensile strength is announced by A. J. Gerrard & Co., 221 North LaSalle street, Chicago 1. It withstands sudden, violent shocks without snapping, and is available in all standard sizes.

20. Self-Adhesive Labels

Labels which stick permanently to any smooth surface despite intense heat, cold or humidity, yet which are easily peeled off without marring the surface, are products of Avery Adhesive Label Corp., 36 West Union street, Pasadena 1, Calif. Called Kum-Kleen labels, they have Underwriters' Laboratories approval, and will adhere without moistening to metal, glass, plastic or any smooth, clean surface. Labels are ⅞-in. diameter and printed in red, yellow and black.

21. Cast Iron Electrode

Machinable welds on cast iron are made with a No. 375 electrode that features a high nickel core wire and a heavy extruded coating announced by Air Reduction Sales Co., 60 East 42nd street, New York 17. High nickel content causes weld to flow well and result in a sound deposit. Weld and fusion zone are easily machined and will withstand hydrostatic pressure.

22. Arc Welding Electrode

Highly resistant to impact or abrasive wear in hard surfacing applications, a new arc welding electrode, Hardalloy, made by McKay Co., 1005 Liberty avenue, Pittsburgh 22, may be heat treated for machining or grinding and subsequently reheated to restore hardness. Its low-hydrogen coating minimizes underbead cracking on hardenable steels. Available in five sizes from 3/32 to 1/4-in.

23. Order Quantity Chart

A chart which gives a rapid, accurate and simple answer to the problem of controlling inventory properly is available from Industrial Chart Co., 2907 East Linnwood avenue, Milwaukee 11. It is a mathematical balance of the various costs involved and limitations desired, and permits direct reading of the proper quantity to order.

24. Cutting Fluid

A liquid concentrate cutting fluid which combines cooling, cleaning and gentleness to the hands, is being produced by Penetone Co., Tenafly, N. J. Noninflammable and nontoxic, it is diluted with approximately 15 parts of water for use as a cutting fluid.

25. Cast Iron Electrodes

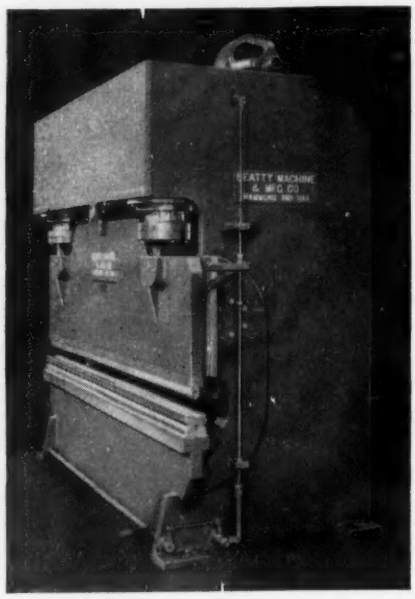
Welds which are strong, nonporous and fully machinable in both the weld and fusion zone areas are produced by Nicast cast iron electrode, developed by Harnischfeger Corp., Milwaukee 14. Electrode is suitable for repairing broken castings, building up worn castings, correcting machining errors and welding cast iron to steel. All position electrode requires no preheating for most applications.

26. Wing-Flap Actuator

Light in weight, a rotary type wing-flap actuator designed for small airplane requirements and weighing less than 4 lb is offered by Westinghouse Electric Corp., Lima, O. With its 1/50-hp motor and a 435 to 1 built-in gear unit, an output of 130 in. lb at 10 rpm from the normal speed of 4350 rpm is possible. The 12-v motor is of reversible type, and is equipped with its own magnetic brake. Auxiliary shaft extension may drive limit switches, etc.

27. Hydraulic Press Brake

Hydraulic press brake adaptable to a variety of V-bending, flanging, pressing and straightening, is announced by Beatty Machine & Mfg. Co., Hammond, Ind. Of 300-ton capacity, this illustrated model



300 machine handles various thicknesses without minute ram adjustment.

Machine's ram advances at maximum of 310 ipm, returning at 285 ipm, while pressing under full load takes place at 14 ipm. These speeds are variable between 0 and maximum. Of open throat, closed housing type, machines are built in capacities from 200 to 600 tons and in sizes from 8 ft 6 in. to 12 ft 6 in. between housings.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in this card. It will receive prompt attention.

Helpful Literature

43. Overhead Cranes

Chicago Tramrail Co. — 8-page illustrated folder "On the Right Track" describes typical applications where underhung and top running, single and double girder push or motor driven overhead cranes of 1 to 10-ton capacity will save time and money in wide range of materials handling operations.

44. Flexible Metal Hose

Chicago Metal Hose Corp. — Catalog No. G-47 deals with improvements made on the Rex-Flex line of stainless steel flexible metal hose and gives data of stainless steel bellows. Engineering information to facilitate use of products is included.

45. Alloy Steels

Carpenter Steel Co. — 10-page illustrated vest-pocket size bulletin "2 Steels Simplify Your Alloy Needs" gives information on No. 5-317 and No. 158 chrome-nickel alloy steels which are claimed to meet 95 per cent of alloy steel requirements. Both grades of steel are available from stock.

46. Wire Feed Screw Machines

Brown & Sharpe Mfg. Co. — 32-page illustrated bulletin "Wire Feed Screw Machines" explains simplicity of operation, production capacity, speed of setup and versatility of machines. Many turret tools for wire feed machines are interchangeable with automatic screw machines. Unit can be used for short runs and second operations.

47. Hydraulic Power Units

Vickers Inc. — 8-page illustrated bulletin No. 46-43 features hydraulic power units which are available as Motorpump type with single, two-pressure or two-stage motor-pump; or as separate motor type with single, two-pressure or two-stage pump. Tank capacities are 20, 30 and 60 gallons. Specification and operation data are charted.

48. Machine Tool Motors

Wagner Electric Corp. — 8-page illustrated bulletin No. MU-25A describes line of totally enclosed motors of both fan cooled and nonventilated types for application to machine tools.

49. Automatic Turning Machine

Monarch Machine Tool Co. — 36-page illustrated catalog "The Uni-Matic" presents information on universal automatic turning machine which is an individually motor driven slide tool designed for mass production. Units can be used either singly or in combinations of two or more.

50. Carbon Graphite Material

United States Graphite Co. — 40-page illustrated catalog "Graphitar" presents information on properties of carbon-graphite Graphitar. Material resists chemical attack, has self-lubricating properties and low coefficient of friction. Applications include use in manufacture of piston rings, cylinder liners, pump blades, forming pads, thrust bearings, clutch disks, furnace lining, baffle plates, cradle blocks, powdered metal molds, etc.

51. Roof Maintenance

Stonhard Co. — 6-page illustrated vest-pocket size folder "Is Your Roof a Fair-Weather Friend" explains how to stop leaks, renew dried out roof surfaces, repair flashings and gutters, etc. Folder illustrates application of repair materials.

52. Water-Mix Cutting Oil

D. A. Stuart Oil Co. — 4-page illustrated pocket-size folder describes Kleen-Kut laboratory-controlled water-mix cutting oil for use in grinding, cutting and chilling operations. Typical applications and proper method for mixing are covered.

53. Variable Rectifiers

Richardson-Allen Corp. — 4-page illustrated folder and enclosed data sheets present information on stepless variable auto transformers which permit continuous control of output from no-load to full-load. Units are designed for 220 or 440-volt 3-phase 60-cycle input.

54. Industrial Clutches

Twin Disc Clutch Co.—52-page illustrated bulletin "Production Road" Manufacturer's edition, deals with machines and engines which incorporate Twin Disc clutches in materials handling, logging, railroading, engine building and metal fabricating operations.

55. Welding Controls

Westinghouse Electric Corp. — 18-page illustrated booklet No. B-3839 covers line of Synchro-Trol alternating current resistance welding controls available as factory assembled units. They include electronic contactor; heat control; weld timer; and seam, pulsation and sequence timer. Five supplementary subunits are available.

56. Grinding Machines

Gardner Machine Co.—8-page illustrated booklet "The Gardner Grinder" covers company's line of grinding machines as used by the Sanitary Scale Co. Illustrations show No. 79-72-inch horizontal disk and No. 115-15-inch machines in actual operation.

57. Arc Welding Electrodes

Wilson Welder & Metals Co. — 32-page illustrated catalog charts recommended arc welding electrodes according to base metal and type of work to enable users to select quickly right electrode for a specific job.

58. Double Helical Gears

Worthington Pump & Machinery Corp., Moore Steam Turbine Div. — 12-page illustrated catalog No. 1958-A presents specifications, applications and operating data on double helical gears for use in reduction or speed increasing service.

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3	18	33	48	63
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12	27	42	57	72
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59. Machine Tools

Rockford Machine Tool Co. — 32-page illustrated catalog No. 1947 presents engineering and construction information on Hy-Draulic line of planers, shapers, slotters, shaper-planers and special equipment. For each machine type, specification data are supplied in detail.

60. Ball Plating Anodes

Udylite Corp.—Illustrated data sheet "Udylite Ball Anodes for Convenience, Efficiency and Economy" presents information on ball anodes which afford maximum anode area in plating operations and reduce sludge to minimum. Scrap losses are eliminated.

61. Automotive Vaporizer

John E. Mitchell Co. — 4-page illustrated folder "The Mitchell Vaporizer" describes fuel vaporization unit for internal combustion engines which is actuated by exhaust heat. Unit can be attached to truck, tractor or stationary engines. It will reduce carbon to minimum and provide engine with dry uniform gas.

62. Industrial Trucks

Towmotor Corp.—24-page illustrated vest pocket size catalog "Lift Truck and Tractor Guide" contains brief operational data and information on line of lift trucks, accessories and tractors which will enable buyers to select equipment best suited for specific applications.

63. Steel Plates

Joseph T. Ryerson & Son, Inc. — 8-page illustrated bulletin "E-Z Cut Plates" describes special type of high manganese, high sulphur analysis steel plate developed for applications involving machining, such as production of rubber molds, machine parts, die bases, jigs, fixtures, etc. Welding information and properties developed by case carburizing are covered.

64. Cutting Tools

Nelco Tool Co.—Catalog describes line of Carboloy tipped cutting tools and makes recommendations for operation and maintenance of these tools. Resharpening procedures, conversion chart and prices are included.

65. Welding Equipment

Hobart Brothers Co.—4-page illustrated folder "Get Better . . . Faster Results on Railroad Welding" describes Weldmobile self-propelled, gasoline engine driven arc welder. Unit has Multi-Range control which provides wide range of voltage and amperage combinations.

66. Power Belt Conveyors

Rapids-Standard Co.—32-page illustrated catalog No. 31-C5 presents specifications, operating data and features of Challenger, Defender, Stevedore, Jr., Floor-Veyor, Horizontal Belt and Press-Veyor materials handling conveyors. Suggested applications are included.

67. Cooling Equipment

Santa Fe Tank & Tower Co. — Cooling equipment guide No. C. E. 47 contains information on cooling towers, fin units, spray ponds, nozzles and other types of cooling equipment.

68. Portable Comparators

Pratt & Whitney Div., Niles-Bement-Pond Co.—4-page illustrated folder No. 491 deals with model C Electrolimit Snap Gages for checking outside dimensions of workpieces in production machine or in inspection departments. There are three gage bodies and a number of frames for each body which cover size range of from 1/2 to 10 inches.

69. Water Conditioners

Cochrane Corp. — 16-page illustrated bulletin No. 4201 describes carbonaceous zeolite water conditioning equipment for softening boiler feed and industrial process waters. Seven typical installations are illustrated. Curves, tables and various chemical reactions involved complete technical data.

70. Ferrous Metallurgy Guide

Tempil Corp.—Plastic laminated 16¼ x 21 inch wall chart entitled "Basic Guide to Ferrous Metallurgy" tabulates information on heat treating, processing, welding and fabricating of steels up to 0.9 per cent carbon. Characteristics of steels at temperatures from —300 to 2900 F are shown and temperature zones for hot working, annealing, normalizing stress relieving, carburizing and preheating are clearly defined by 19 shades approximating characteristic hot-body hues. Twenty-three fundamental metallurgical terms are defined also.

71. Hollow Spindle Lathes

R. K. LeBlond Machine Tool Co. — 4-page illustrated folder No. HS-110 describes features, attachments, feeds, threads, bed and capacities of 16 and 18-inch hollow spindle lathes having a 5¼ inch hole in spindle.

72. Air Compressor Lubrication

Cities Service Oil Co. — 38-page illustrated catalog No. A-601 is compilation of technical data relative to the lubrication of various types of air compressors and their auxiliary equipment.

73. Castable Refractory

Babcock & Wilcox Co.—Bulletin No. R-21 describes uses and advantages of Kaokast 3000-degree castable refractory. Instructions for use, applications and physical characteristics are outlined.

74. Electronics Training

General Electric Co.—4-page illustrated folder No. GES-3303A presents information on complete set of training material on industrial electronics. Course offers practical and easily understood presentation made in twelve lessons. Set consists of slide films and records, review booklets and instructors' guide.

75. Industrial Doors

Kinnear Mfg. Co. — 40-page illustrated catalog A.I.A. File No. 16-D-13 covers complete line of service type, fire and shutter RoL-Top, Bifold, steel rolling and special doors of all types which can be either motor or hand operated.

FOR MORE INFORMATION USE ONE OF THESE CARDS . . .

STEEL—Penton Building, Cleveland 13, Ohio **5-19**

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2	17	32	47	62
3	18	33	48	63
4	19	34	49	64
5	20	35	50	65
6	21	36	51	66
7	22	37	52	67
8	23	38	53	68
9	24	39	54	69
10	25	40	55	70
11	26	41	56	71
12	27	42	57	72
14	29	44	59	74
15	30	45	60	75

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Supply Conditions in Some Products Seen Easing Soon

Indications are steel buyers will receive a little more tonnage of certain items over coming months though overall supply conditions will continue tight for rest of year. Little relief in sight for sheets and strip

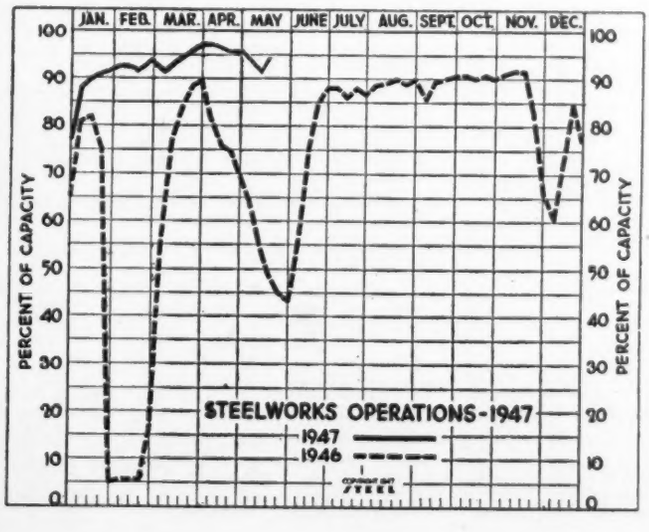
CONSUMER pressure for finished steel products continues unabated, being especially urgent in sheets and strip, plates and merchant pipe. Lack of steel has forced some plants, chiefly automotive, to close temporarily and many other metalworking shops are unable to build inventories sufficient to support capacity operations. Tight supply persists in face of record-breaking peacetime shipments from the mills, March tonnage being the largest since May, 1945.

Buyers stand to obtain a little more tonnage than they now are receiving over the next few months, assuming no important break in steel production, but, as a general thing, overall supply is expected to remain tight over the remainder of this year, particularly in sheets and strip.

Some important easing in supply of bars, shapes and nails is likely as current record-breaking peacetime output gradually fills inventory pipelines. In fact, some easing in carbon bars and shapes, except the smaller sizes, already is in evidence. Alloy products, including stainless, are plentiful, and mixed trends are noted in wire. This trend is due partly to unbalanced steel inventories, and to the fact buyers are exerting more caution in ordering.

There is little in the way of order cancellations, but increasing rescheduling is noted with shipments covering more extended periods. No backing up in steel supply is yet seen as result of customer resistance to prices in hard consumer goods lines.

Significantly, an easier trend in demand for iron castings is noted, April production of some foundries actually exceeding new bookings. Also some foundries report order cancellations, including soil pipe, indicating supplies of this product, for which high pig iron preference has been given, are beginning to catch up with housing needs.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended May 17	Change	Same Week 1946	Same Week 1945
Pittsburgh	100	— 0.5	40	92
Chicago	89	+10.5	45.5	97.5
Eastern Pa.	91.5	None	36	93
Youngstown	93	+ 2	43	90
Wheeling	93.5	+12	72	92
Cleveland	91	— 6	77.5	92.5
Buffalo	86	— 2.5	49	60
Birmingham	99	None	44	95
New England	95	None	75	90
Cincinnati	89	+ 2	84	92
St. Louis	68.5	None	44.5	80
Detroit	90	None	84	88
Estimated national rate	94.5	+ 2.5	49	93.9

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.

Talk of early change in steel prices has disappeared. With costs rising no substantial reduction is anticipated, higher steel wages precluding any substantial price cut in near future. Scrap appears settling around $30, Pittsburgh, for heavy melting steel. The trade, generally, leans to the view the bottom of the current scrap price movement has been about reached, especially in view of continued high steelmaking operations.

Dual prices for copper are making for confusion in this market. Average prices paid by consumers are moving slightly higher, indicating more 24.00-cent per pound metal is being bought. Fabricators, on the other hand, continue to base prices for their products on 21.50-cent copper and are forced to juggle sales terms to cover the difference in some cases.

Steelmaking operations recovered sharply last week from the effects of labor troubles, the estimated national rate rising 2½ points to 94.5 per cent of capacity. Resumption of operations at Inland Steel Co. plants boosted the Chicago rate 10½ points to 89 per cent. Operations were also sharply higher at Wheeling, the rate rising 12 points to 93.5 per cent, while they were 2 points higher at 93 per cent in Youngstown and 89 per cent in Cincinnati. Production dropped 6 points to 91 per cent in Cleveland, 2½ points to 86 per cent in Buffalo, and ½ point in Pittsburgh to 100 per cent. Elsewhere operations were unchanged.

STEEL's composite price averages held unchanged last week at $69.82 for finished steel, $52.10 for semi-finished steel, $32.49 for steelmaking pig iron, and $29.42 (revised) for steelmaking scrap.

COMPOSITE MARKET AVERAGES

	May 17	May 10	May 3	One Month Ago Apr., 1947	Three Months Ago Feb., 1947	One Year Ago May, 1946	Five Years Ago May, 1942
Finished Steel	$69.82	$69.82	$69.82	$69.82	$69.82	$63.54	$56.73
Semifinished Steel	52.10	52.10	52.10	52.10	52.10	40.60	36.00
Steelmaking Pig Iron	32.49	32.49	32.49	32.49	29.59	25.50	23.00
Steelmaking Scrap	29.42	*29.42	30.58	33.94	37.25	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.
* Revised.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	May 17, 1947	Apr., 1947	Feb., 1947	May, 1946
Steel bars, Pittsburgh	2.60c	2.60c	2.60c	2.50c
Steel bars, Philadelphia	2.98	2.98	2.98	2.82
Steel bars, Chicago	2.60	2.60	2.60	2.50
Shapes, Pittsburgh	2.50	2.50	2.50	2.35
Shapes, Philadelphia	2.64	2.64	2.64	2.485
Shapes, Chicago	2.50	2.50	2.50	2.35
Plates, Pittsburgh	2.65	2.65	2.65	2.50
Plates, Philadelphia	2.85	2.85	2.85	2.55
Plates, Chicago	2.65	2.65	2.65	2.50
Sheets, hot-rolled, Pittsburgh	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Pittsburgh	3.55	3.55	3.55	†4.05
Sheets, hot-rolled, Gary	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Gary	3.55	3.55	3.55	†4.05
Hot-rolled strip, Pittsburgh	2.50	2.50	2.50	2.35
Cold-rolled strip, Pittsburgh	3.20	3.20	3.20	3.05
Bright basic, bess. wire, Pittsburgh	3.425	3.425	3.425	3.05
Wire nails, Pittsburgh	4.125	4.125	4.125	3.25
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$50.00	$50.00	$50.00	$38.00
Slabs, Pittsburgh, Chicago	42.00	42.00	42.00	39.00
Rerolling billets, Pittsburgh	42.00	42.00	42.00	39.00
Wire rods ⅜ to ¾-inch, Pitts.	2.55c	2.55c	2.55c	‡2.30c

‡ Base, No. 5 to ⅜-in.

Pig Iron

	May 17, 1947	Apr., 1947	Feb., 1947	May, 1946
Bessemer, del. Pittsburgh	$34.83	$34.83	$31.83	$27.69
Basic, Valley	33.00	33.00	30.00	26.00
Basic, eastern del. Philadelphia	35.52	35.52	32.01	27.84
No. 2 fdry., del. Pgh. N. & S. sides	34.33	34.33	31.33	27.19
No. 2 fdry., del. Philadelphia	36.02	36.02	32.51	28.34
No. 2 foundry, Chicago	33.00	33.00	30.50	26.90
Southern No. 2 Birmingham	29.88	29.28	26.88	26.94
Southern No. 2, del. Cincinnati	34.75	34.15	31.75	28.34
Malleable, Valley	33.50	33.50	30.50	26.50
Malleable, Chicago	33.50	33.50	30.50	26.90
Charcoal, low phos., fob Lyles, Tenn.	40.50	40.50	37.50	33.00
Gray forge, del. McKees Rocks, Pa.	33.66	33.66	30.66	26.55
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.19	140.00

Scrap

Heavy melting steel, No. 1, Pittsburgh	$30.00	$35.80	$33.75	$20.00
Heavy melt. steel, No. 2, E. Pa.	28.00	33.50	32.25	18.75
Heavy melt. steel, Chicago	28.75	32.75	31.25	18.75
Rails for rerolling, Chicago	34.00	38.25	38.50	22.25
No. 1 cast, Chicago	35.50	42.50	42.50	20.00

Coke

Connellsville, furnace ovens	$9.125	$9.06	$8.875	$8.15
Connellsville, foundry ovens	10.375	10.375	9.875	8.90
Chicago, by-product fdry., del.	16.10	16.10	16.10	13.75

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality, $40, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Canton, $52.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $42; Portsmouth Steel Corp., $55-$60, Portsmouth, O. Detroit, del., $45; eastern Mich., $46.

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $50; Detroit, del., $53; eastern Mich., $54.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $61; del. Detroit $64; eastern Mich., $65.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $50; Portsmouth Steel Corp., $66, Portsmouth, O.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.35c per lb.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, ⅜ to ¼-in., inclusive $2.55-$2.80 per 100 lb. Galveston base, $2.65. Worcester, add $0.10. San Francisco (base, del.), $3.27.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.60c; Detroit, del., 2.75c; eastern Mich., 2.80c; New York, del., 3.01c; Phila., del., 2.98c, San Francisco (base, del.), 3.33-3.65c; Los Angeles (base, del.), 3.325-3.56c; Seattle, 3.285c, base.

Rail Steel Bars: Price, 2.60c-2.95c, same basing points as merchant carbon bars, except base is 10 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.05c; Detroit, del., 3.20c; eastern Mich., 3.25c (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.20c; Detroit, 3.35c; Toledo, 3.40c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 3.80c; Detroit, del., 3.95c; eastern Mich., 4.00c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.45c; San Francisco (base, del.), 3.03c; Los Angeles (base, del.), 3.025c; Seattle, 2.985c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.60c-2.95c.

Iron Bars: Single refined, Pittsburgh, 6.15c-†6.70c; double refined, 7.00c-†8.50c; Pittsburgh, staybolt, 7.85c-†10.00c.

† Hand puddled.

Sheets

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c; Philadelphia, del., 2.70c; New York, del., 2.79c; Los Angeles (base, del.), 3.24c; San Francisco, (base, del.), 3.245c. (Andrews Steel Co., quotes Middletown, O., base for shipment to Detroit; Alan Wood Steel Co., Conshohocken, Pa., quotes 3.10c, Sparrows Point, Md., base; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.20c; Granite City, base, 3.30c; Detroit, del., 3.35c; eastern Mich., del., 3.40c; New York, del., 3.61c; Philadelphia, del., 3.58c.

Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.55c; New York, del., 3.84c; Philadelphia, del., 3.75c; Los Angeles (base, del.), 4.32c; San Francisco (base, del.), 4.325c.

Corrugated Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, base, 3.55c.

Culvert Sheets, No. 16, corrugated: Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.15c; copper-iron or pure iron, 4.50c. Granite City base prices 10 points higher. Los Angeles (base, del.), 4.94c; San Francisco (base, del.), 4.945c.

Aluminized Sheets: No. 20 hot-dipped, coils or cut to lengths: Pittsburgh, 9.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.55c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.55c; Granite City, base, 3.65c; Detroit, del., 3.70c; eastern Mich., 3.75c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.20c; Kokomo, Ind., 4.30c. Armature: Pittsburgh, Chicago, Gary, 4.50c; Granite City, Ill., Kokomo, Ind., 4.60c. Electrical: Pittsburgh, Chicago, Gary, 5.00c; Granite City, Kokomo, 5.10c. Motor: Pittsburgh, Chicago, Gary, 5.75c; Granite City, 5.85c. Dynamo: Pittsburgh, 6.45; Granite City, 6.55c. Transformer 72, 6.95c; 65, 7.65c; 58, 8.35c; 52, 9.15c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c. (Superior Steel Corp., 3.30c, Pittsburgh.)
Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.20c; Chicago, base, 3.30c; Detroit, del. 3.35c; eastern Mich., 3.40c; Worcester, base, 3.40c. (Superior Steel Corp., 4.70c, Pittsburgh.)
Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.20c; over 0.40 to 0.60 carbon, 4.70c; over 0.60 to 0.80, 5.30c; over 0.80 to 1.00, 6.80c; over 1.00, 9.10c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.
Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.70c.
Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $13.50; 15-16 $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.65c; Coatesville, Claymont, Geneva, Utah, 2.80c; New York, del. 2.94c; Phila., del., 2.85c; St. Louis, del., 2.47c; Boston, del., 2.86c; San Francisco and Los Angeles, del., 3.29c-3.46c.
(Central Iron & Steel Co., Harrisburg, Pa., 3.85c, basing points; Alan Wood Steel Co., Conshohocken, Pa., 2.80c, Coatesville and Claymont equivalent.)
Floor Plates: Pittsburgh, Chicago, 3.90c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.787c; Coatesville, 4.15c.
Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.50c; New York, del., 2.70c; Phila., del., 2.64c; Geneva, Utah (base, del.), 2.675c; Los Angeles (base, del.), 3.17c-3.41c; Los Angeles and San Francisco (sizes produced at Geneva only), del., 3.14c; Kaiser, del., San Francisco, 3.41c.
(Phoenix Iron Co., Phoenixville, Pa., nominally, 4.00c, fob Phoenixville.)
Steel Piling: Pittsburgh, Chicago, Buffalo, $3 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).
Wire to Manufacturers in carloads
Bright, basic or bessemer .....*$3.30-$3.55
Spring (except Birmingham) **$4.25
Wire Products to Trade
Nails and Staples
Standard and cement-coated.....†$3.75-$4.50
Galvanized .....‡$3.75-$4.50
Wire, Merchant Quality
Annealed (6 to 8 base) ..... §$3.95
Galvanized (6 to 8 base) ..... §$4.40
(Fob Pittsburgh, Chicago, Birmingham, per base column)
Woven fence, 15 gage and heavier .... ††84
Barbed wire, 80-rod spool ..... ††94
Barbless wire, twisted 94
Fence posts (no clamps) ..... ††90
Bale ties, single loop ..... ††86

* Worcester, $3.40, Duluth, $3.35, base. San Francisco (base, del.) $4.31 for bright basic only.
** Worcester $4.35, Duluth and Trenton, N. J., $4.50, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.
† Worcester $4.05, Cleveland $3.85, base. San Francisco (base, del.) $4.83.
‡ Duluth $3.75, Cleveland $3.85, base. San Francisco (base, del.) $4.83.
§ Worcester $4.05, annealed; $4.50, galvanized. Duluth $3.95, annealed; $4.40, galvanized base. San Francisco (base, del.) $4.96, annealed; $5.41, galvanized.
†† San Francisco (base, del.): Woven fence, 107; barbed wire, 114; bale ties, 110. Duluth (base): Woven fence, 84; barbed wire, 94; fence posts, 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.50 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $2.85 per 100 lb; light rails (rail steel), $2.95, Williamsport, Pa.
Relaying, 60 lb and over, fob railroad and basing point, $46-$49 per net ton.

Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates, $2.80 per 100 lb, fob mill; $3.15 base, Seattle. Splice bars, $3 per 100 lb. Standard spikes, 3.65c-4.50c; screw spikes, 5.30-6.40c.

Tubular Goods

Standard Pipe: Basé price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

Butt Weld

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	48	23	½	— 2	+20
¼ & ⅜	51	30½	¾	—11½	+10
½	55½	41	1-1¼	—17	+ 2
¾	58½	45	1½	—22½	— 1½
1-3	60½	47½	2	—23	— 2

Lap Weld

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk.	Gal.
2	53	39½	1¼	— 1	+20
2½-3	56	42½	1½	— 7	+13
3½-6	58	44½	2	—14½	+ 5½
*8	58	42½	2½-3½	—17	+ 1½
*10	57½	42	4	—21	— 4
*12	56½	41	4½-8	—19	— 2½
			9-12	—10	+ 7

* Not T. & C.

Seamless
Steel

In.	Blk.	Gal.	In.	Blk.	Gal.
2	52	38½	*8	57	42
2½-3	55	41½	*10	56½	42
3½-6	57	43½	*12	55½	41

* Not T. & C.

Line Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Seamless	In.	Butt Weld
2	51	⅛	47
2½ & 3	54	¼ & ⅜	50
3½ to 8	56	½	54½
10	55½	¾	57½
12	54½	1 to 3	59½

Boiler Tubes: Net base prices per 100 feet, fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D.		—Seamless—		—Elec. Weld—	
Sizes	B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1"	13	....	$10.89	$10.62	$10.62
1¼"	13	....	12.90	10.59	12.58
1½"	13	$12.00	14.26	11.70	13.90
1¾"	13	13.65	16.23	13.31	15.82
2"	13	15.29	18.17	15.00	17.95
2¼"	13	17.05	20.26	16.71	20.00
2¼"	12	18.78	22.31	18.38	22.00
2½"	12	20.57	24.43	20.11	24.07
2¾"	12	21 80	25.89	21.27	25.46
3"	12	22.87	27.18	22.26	26.68
3¼"	11	26.88	31.94	26.15	31.33
3½"	11	28.86	34.30	28.06	33.64
4"	10	35.82	42.55	34.78	41.68
4½"	9	47.48	56.42	....	....
5"	9	54.96	65.30	....	....
6"	7	84.38	100.25	....	....

Pipe, Cast Iron: Class B, 6-in. and over $65 per net ton, Birmingham; $70, Burlington, N. J.; $75.56, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length ..... 55 off
⅝ and ⅝, up to 6 in. in length..... 52 off
¾ x 6 in. ..... 49 off
⅞ and 1 in. x 6 in. length..... 51 off
1⅛ in. and larger in all lengths and ⅞ in. and larger in lengths over 6 in. .. 48 off
½ in. and smaller, longer than 6 in. ... 45 off
Tire bolts .....38½ off
Step bolts ..... 46 off
Plow bolts ..... 57 off

Stove Bolts

In packages, nuts separate, 60-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller.....	51 off	.....
½-in. and smaller.....	.....	48 off
½-in.-1-in.	48 off	.....
⅝-in.-1-in.	.....	47 off
1⅛-in.-1½-in.	46 off	45 off
1⅝-in. and larger	.....	44 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in., smaller (10-20 bright)..... 56 off
Upset (10-35 heat treated)
⅝ x 6 ..... 51 off
¾, ⅞, & 1 x 6..... 47 off

Square Head Set Screws

Upset 1-in. and smaller..... 61 off
Headless, ¼-in. and larger..... 46 off
No. 10 and smaller..... 56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural 5.25c
Lebanon, Pa. 5.40c
⅞-in. and under.....55-5 off
Lebanon, Pa. .....55-5 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl .....$1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per bbl; reg. carbon 16.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	74.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	62.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301....	26.00c	29.50c	37.00c	22.00c	28.00c
302....	26.00	29.50	37.00	23.50	30.50
303....	28.50	31.50	39 00	29.50	36.00
304 ...	27.50	31.50	39.00	25.50	32.50
308....	31.50	37.00	44.50	31.00	38.00
309....	39.00	43.50	51.00	40.50	51.00
310....	53.50	56.50	57.50	53.00	61.00
316....	43.50	48.00	52.00	43.50	52.00
321....	31.50	37.00	44.50	32.00	41.50
347....	36.00	41.50	49.00	36.00	45.50
431....	21.00	24.00	31.50	19.00	24.50
440A ..	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403....	23.50	27.00	32.00	23.00	29.50
410....	20.50	23.50	29.00	18.50	24.00
416....	21.00	24.00	29 50	20.00	25.50
420....	26.00	31.00	36.50	26.00	39.50
430....	21.00	24.00	31.50	19.00	24.50
430F ..	21.50	24.50	32.00	20.50	27.00
442....	24.50	28.00	35 50	26.00	35.00
443....	24.50	28.00	35.50	26.00	35.00
446....	30.00	33.00	39.50	38.00	56.50
*501...	9.00	13.00	17.50	13.00	18.50
*502...	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304....	....	24.00	22.00	....	....
410....	....	22.00	20.00	....	....
430....	....	22.50	20.50	....	....
446....	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax

Pig Iron

Prices per gross ton	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$34.50	$34.00	$35.50	$35.00
Newark, N. J., del.	36.34	35.84	37.34	36.84
Brooklyn, N. Y., del.	37.50	....	....	38.00
Birdsboro, Pa., base	34.50	34.00	35.50	35.00
Philadelphia, del.	36.02	35.52	37.02	36.52
Birmingham, base	29.88	29.38	34.50	....
Baltimore, del.	36.28	....	....	....
Chicago, del.	34.12	....	....	....
Cincinnati, del.	34.75	34.25	....	....
Newark, N. J., del.	35.96	....	....	....
Philadelphia, del.	35.13	....	....	....
St. Louis, del.	33.87	33.37	....	....
Buffalo, base	33.00	32.50	34.00	33.50
Boston, del.	39.48	38.98	40.48	39.98
Rochester, del.	34.84	34.34	35.84	35.34
Syracuse, del.	35.50	35.00	36.50	36.00
Chicago, base	33.00	32.50	34.00	33.50
Milwaukee, del.	34.32	33.82	35.32	34.83
Muskegon, Mich., del.	36.83	....	....	37.33
Cleveland, fob furnace	33.00	32.50	34.00	33.50
Akron, del.	35.17	34.17	35.67	35.17
Duluth, base	33.50	33.00	34.50	34.00
Erie, Pa., base	33.00	32.50	34.00	33.50
Everett, Mass., base	29.50	29.00	30.50	30.00
Boston, del.	30.00	29.50	31.00	30.50
Granite City, Ill., base	33.50	33.00	....	33.50
St. Louis, del.	34.25	33.75	....	34.25
†**Neville Island, Pa.,** base	33.50	33.00	34.00	33.50
Pittsburgh, del., N. & S. Sides	34.33	33.83	34.83	34.33
Provo, Utah, base	33.50	33.00	....	....
Seattle, Tacoma, Wash., del.	38.60	....	....	....
Portland, Oreg., del.	38.60	....	....	....
Sharpsville, Pa., base	33.50	33.00	34.00	33.50
Steelton, Pa., base	34.50	34.00	35.50	35.00
Swedeland, Pa., base	35.50	35.00	36.50	36.00
Troy, N. Y., base	34.50	34.00	35.50	35.00
Toledo, O., base	33.00	32.50	34.00	33.50
Cincinnati, del.	36.50	36.00	....	....
Youngstown, O., base	33.50	33.00	34.00	33.50
Mansfield, O., del.	36.48	35.98	36.98	36.48

† To Neville Island base add: 66c for McKees Rocks, Pa.; $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O. charges 50 cents a ton in excess of Sharpsville, Pa., basing point price for No. 2 foundry, basic, bessemer and malleable pig iron.

High Silicon Silvery

6.00-6.50 per cent (base).....$40.50

6.51-7.00	$41.50	9.01- 9.50	46.50
7.01-7.50	42.50	9.51-10.00	47.50
7.51-8.00	43.50	10.01-10.50	48.50
8.01-8.50	44.50	10.51-11.00	49.50
8.51-9.00	45.50	11.01-11.50	50.50

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Electric Furnace Ferrosilicon: Si 14.01-14.50%, $65.75, Jackson, O.; $67, Niagara Falls; $68, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.... $40.50 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $33.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., Birdsboro, Pa., $39, base; Philadelphia, $41.16, del. Intermediate phosphorus, Central furnace, Cleveland, $36.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*$8.75–$9.50
Connellsville, foundry	9.75–11.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

* Operators of hand-drawn ovens using trucked coal, $9.35-$10.10.

By-Product Foundry

Kearney, N. J., ovens	$15.35
Chicago, outside del.	15.10
Chicago, del.	16.10
Terre Haute, del.	15.60
Milwaukee, ovens	15.85
New England, del.	17.25
Birmingham, del.	12.35
Indianapolis, ovens	14.50
Cincinnati, del.	15.35
Ironton, O., ovens	13.35
Painesville, ovens	14.60
Cleveland, del.	15.90
Buffalo, del.	16.10
Detroit, del.	15.75
Philadelphia, ovens	14.50
Portsmouth, O., ovens	14.00
Fairmount, W. Va., ovens	13.75
Pittsburgh, del.	15.61

Coke By-Products

Spot, gal, freight allowed east of Omaha

Pure and 90% benzol	17.00c
Toluol, two degrees	22.00c
Industrial xylol	22.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl. to jobbers, "household use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	76.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	24.00
Single bags	28.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

N. African low phos.	Nom.
Swedish basic, 60 to 68%	13.00
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro	7.50–8.00

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$27–$28

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27-$27.50
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00

Brazilian—nominal

44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	$27-27.50
48% no ratio	30.00
48% 3:1 lump	39.00

Domestic (seller's nearest rail)

48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	3.75–3.85	3.75–3.85	3.75–3.85	3.85	3.85	3.75–3.85	...	...	...
Cold-Rolled	4.55–4.75	4.55–4.75	4.55–4.75	4.75	...	4.55–4.75	...	...	...
Galvanized	5.40	.....	.....	...	...	.....	...	...	...
Strip, Hot-Rolled	3.75–3.85	3.75–3.85	3.75–3.85	3.85	...	.....	...	...	...
Cold-Rolled	4.55	4.65	4.65	4.65	...	.....	...	...	...
Shapes, Structural	3.85	3.85	.....	3.85	...	.....	3.85	...	...
Plates	4.10	4.10	4.10	...	4.10	.....	...	...	...
Bars and Bar Shapes	4.00	4.00	4.00	4.00	...	4.00	...	4.00	4.00

Note: Lower level of quoted ranges represent prices for NAX High Tensile, produced by Great Lakes Steel Corp., Detroit.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. •10G	Gal. •24G	†H-R	C-R	H-R	C-F	H-R Alloy ($4140)	Structural Shapes	Carbon ¾"-¾"	Floor ¾" & Thicker
Boston (city)	4.50	5.67[4]	5.22[4]	5.55[4]	6.80[4]	4.65	6.36	4.62	5.22	7.12	4.47	4.70	6.42
††New York (city)	4.42	....	5.27[6]	5.47[6]	....	4.62	....	4.62	5.17	8.42[12]	4.37	4.72	6.35
New York (country)	4.32	....	5.17[6]	5.37[6]	....	4.52	....	4.52	....	....	4.27	....	6.25
Philadelphia (city)	4.24	5.73[9]	5.33[9]	5.29[5]	6.54[5]	4.43	5.28	4.48	5.38	6.87	4.22	4.44	5.93
Philadelphia (country)	4.14	5.63[9]	5.23[9]	5.19[5]	6.44[5]	4.33	5.18	4.38	....	6.60	4.12	4.84	5.83
Baltimore (city)	4.09	6.15[8]	5.65[8]	5.14[8]	6.39[8]	4.40	..	4.45	5.10	....	4.34	4.39	5.90
Baltimore (country)	3.59	6.05[8]	5.55[8]	....	....	....	....	....	....	....	4.24	4.29	5.80
Washington (city)	4.35	....	....	5.18[8]	6.43[8]	4.65	....	4.70	5.60[11]	....	4.60	4.65	6.60
Norfolk, Va.	4.35	....	....	....	....	....	....	4.75	5.50	....	4.50	4.50	6.25
Buffalo (city)	4.05	....	4.75[6]	5.35[8]	....	4.30	5.25	4.10	4.75	....	4.10	4.65	5.90
Buffalo (country)	3.90	....	4.60[6]	4.95[6]	....	3.90	4.85	3.95	4.60	6.60	3.95	4.20	5.45
Pittsburgh (city)	4.05	5.20[8]	4.75[8]	5.10[8]	6.35[8]	4.05	5.00	4.10	4.75	6.60	4.10	4.30	5.60
Pittsburgh (country)	3.90	5.05[8]	4.60[8]	4.95[8]	6.20[8]	3.90	4.85	3.95	4.60	6.60	3.95	4.15	5.45
Youngstown, O. (city)	4.188	5.338	4.888	5.05	6.30	4.00	....	4.238	5.138	....	4.218	4.488	5.178
Youngstown, O. (country)	....	....	....	4.95	6.20	3.90	....	....	....	....	....	....	....
Detroit	4.15	5.30	4.85	5.42	6.67	4.34	5.24	4.20	4.87[12]	7.01	4.42	4.49	5.92
Cleveland (city)	4.05	5.20[8]	4.75[8]	5.238[8]	6.488[8]	4.188	5.10	4.10	4.75	6.858	4.311	4.25	5.961
Cleveland (country)	3.90	5.05[8]	4.60[8]	....	....	3.90	4.95	3.95	4.60	....	....	4.10	....
Cincinnati	4.116	5.266[8]	....	5.166[8]	....	4.394	....	4.403	5.303	....	4.444	4.453	5.944
Chicago (city)	4.05	5.20[8]	4.75[8]	5.10[8]	6.35[8]	4.05	5.10	4.10	4.75	6.60[13]	4.10	4.25	5.75
Chicago (country)	3.90	5.05[8]	4.60[8]	4.95[8]	6.20[8]	3.90	4.95	3.95	4.60	6.60[13]	3.95	4.10	5.60
Milwaukee	4.249	5.399[8]	4.949[8]	5.299[8]	6.549[8]	4.249	5.299	4.299	4.949	6.899	4.299	4.449	5.949
St. Paul	4.384[1]	5.534[8]	5.084[8]	5.434[8]	6.684[8]	4.404[13]	....	4.434[13]	5.726[11]	7.084[13]	4.434[13]	4.684[13]	6.084[13]
Indianapolis	4.04	....	4.84[8]	5.29[8]	6.54[8]	4.24	....	4.361††	5.26	....	4.36	4.61	6.01
St. Louis	4.199	....	4.899[9]	....	6.674[8]	4.199	....	4.249	5.324[12]	7.074	3.999	3.999	5.999
Birmingham (city)	3.85[20]	....	....	5.20[8]	....	4.10[20]	....	4.05[20]	5.83	....	4.05	4.30	6.56
Birmingham (country)	3.75[20]	....	....	5.20[8]	....	4.00[20]	....	3.95[20]	....	....	3.95	4.20	....
New Orleans	4.46[20]••	....	5.77[8]	....	....	4.83[20]	....	4.78[20]••	5.94[11]	....	4.68[20]••	5.03[20]	6.94[20]
Houston, Tex.	5.00[1]	....	....	6.00	....	6.00[1]	....	5.35[1]	....	6.35	5.85	5.85	6.40
Omaha, Nebr.	4.868	6.118[8]	....	5.918[8]	7.168[8]	4.862	....	4.918	5.818[11]	....	4.918	5.068	6.568
Los Angeles	5.55	....	7.10[8]	....	8.10[8]	5.65	8.35	5.10	6.90[19]	7.85	5.20	5.10	7.20
San Francisco	4.90§§	....	6.30[5]	....	7.35[8]	5.20[14]	8.35[14]	4.75[14]	•••	9.35[16]	4.90[14]	5.00[14]	6.80[14]
Tacoma, Wash.	....	....	....	6.30[8]	....	5.30[17]	....	5.00[17]	7.10[19]	8.50[19]	4.95[17]	5.15[17]	7.25[17]
Seattle	5.00[17]	....	....	6.30[8]	....	5.30[17]	....	5.00[17]	7.10[19]	8.50[19]	4.95[17]	5.15[17]	7.25[17]

Base Quantities: 400 to 1999 pounds except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 pounds and over; [1]—any quantity; [2]—300 to 1999 pounds; [3]—150 to 2249 pounds; [4]—three to 24 bundles; [5]—450 to 1499 pounds; [6]—one bundle to 1499 pounds; [7]—one to nine bundles; [8]—400 to 1499 pounds; [9]—1000 to 1999 pounds; [10]—450 to 39,999 pounds; [11]—1000 to 39,999 pounds; [12]—1000 pounds and over; [13]—400 to 14,999 pounds; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 4999; [17]—300 to 9999 pounds; [18]—1500 to 1999 pounds; [19]—1500 to 39,999; [20]—400 to 3999 pounds.

• Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ basing point cities with quotations representing mill prices plus warehouse spread; § as rolled, except New York, Jersey City, Indianapolis and San Francisco where price represents annealed bars; •• add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier; ••• rounds under ⅜ in. 7.00c, ⅜ in. and over 6.50c, squares, hexagons and flats 6 in. and narrower 7.50c, flats over 6 in. 8.25c at San Francisco.

PRICES OF LEADING FERROALLOYS PRODUCTS

Spiegeleisen: 19-21% Mn, 1-3% Si, carlot per gross ton, Palmerton, Pa., $44; Pittsburgh, $48. 16% to 19% Mn, Pittsburgh, $47.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie-Illinois Steel Corp. is producer); add $8 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.30c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) Prices per lb of briquets: Contract, bulk, carlots, 7.00c, packed, carlots, 7.60c, ton lots, 8.00c, smaller lots 8.40c, eastern, freight allowed; 7.25c, 7.85c, 8.60c and 9.00c, central; 7.80c, 8.40c, 10.50c and 10.90c, western; spot up 0.25c; notched, up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $2.25; contract, $2.08; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

Ferrovanadium: V 0.35-0.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 13.80c, ton lots 14.30c, smaller lots 14.80c; 75%, c.l. 11.05c, ton lots 11.65c, smaller lots 12.25c; 50%, c.l. 9.00c, ton lots 9.65c, smaller lots 10.30c. Deduct 1.00c for bulk, carlots, 80-90% and 90-95%; 1.05c, 75%; 1.20c, 50%. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots. **High carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c. **Low carbon,** eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22.00c, 0.2% 21.75c; 0.5% 21.50c, 1% 21.00c, 2% 20.50c; add 1.35c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l.; and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carlot packed differential 0.80c. Prices are per lb of contained Cr, freight allowed.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 21.00c; packed carlot 21.80c, ton lots 22.35c, smaller lots 23.35c, eastern, freight allowed, per pound of contained Cr; 21.40c, 22.20c, 23.00c, and 24.00c, central; 21.50c, 22.30c, 24.20c and 25.20c, western spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; spot prices 0.25c higher; notched, 0.25c higher.

Chromium Metal: 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb to c.l. 80c; central 81c and 82,60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10c, ton lots 17.60c, smaller lots 18.60c, eastern, freight

allowed; 16.60c, 18.45c, 19.45c, central; 18.65c, 20.20c, 21.20c, western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, lump, packed, carlots 14.60c, ton lots 16.40c, smaller lots 17.10c, eastern, freight allowed; 15.10c, 16.85c, 17.85c, central; 17.15c, 19.00c, 20.00c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 14.50c; 2000 lb to c.l. 16.00c; central zone, 15.10c and 18.25c; western, 15.70c and 20.00c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l. 14.10c; 2000 lb to c.l. 15.60c; central 14.70c and 17.85c; western, 15.30c and 19.60c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese Briquets: Containing exactly 2 lb Mn and about ¼ lb Si, eastern zone, bulk, c.l. 6.75c, ton lots 7.75c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Silicon Briquets: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.70c, ton lots 5.10c, smaller lots 5.50c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.85c, ton lots 5.25c, smaller lots 5.65c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn., max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max, Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicas Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Prices per lb of alloy, contract, carlots 13.50c, ton lots 14.25c, smaller lots 15.00c, eastern zone, freight allowed; 13.80c, 15.35c, 16.10c, central; 13.80c, 17.30c, 18.05c, western; spot up 0.25c.

CMSZ Alloys 4 & 5: (Alloy 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3.00-4.50%; alloy 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%). Prices per lb of alloy, contract or spot, bulk, carlots 14.50c; packed, carlots 15.25c, ton lots 16.00c, smaller lots 16.75c, eastern, freight allowed; 14.80c, 15.55c, 17.10c, 17.85c, central; 14.80c, 15.55c, 19.05c, 19.80c, western.

Zirconium alloy: 12-15%, per lb of alloy, eastern, contract, bulk, carlots 5.50c, packed, carlots 6.05c, ton lots 6.40c, smaller lots 6.75c; spot up 0.25c.

Zirconium alloy: Zr 35-40%, eastern, contract, packed, carlots 17.00c, ton lots 17.75c, smaller lots 19.00c; spot up 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; smaller lots 7.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 98.8%, $2.90, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% Na_2O; or air dried, 83-85% V_2O_5 and 5.15% Na_2O, $1.10 per lb contained V_2O_5 fob plant freight allowed on quantities of 25 lb and over to St. Louis.

Crane Says Metal Prices are Too High

Statement by chairman of St. Joseph Lead Co. covers lead, zinc and copper

NEW YORK—Present prices of lead, zinc and copper are too high, but they could have gone higher if the mining industry had sought to get all it could for its products, Clinton H. Crane, chairman, St. Joseph Lead Co., told stockholders last week. This statement follows closely that of an American Smelting & Refining Co. official who said that in his opinion metal prices have reached their peak and that the next movement would be downward. However, Mr. Crane believes that lead has reached its highest price but isn't sure whether the price of zinc will go higher because of the uncertainty regarding continuation of the premium price plan. If the subsidy expires June 30, zinc prices may go higher.

COPPER — Electrolytic copper in the domestic market is now quoted 21.50c to 24.00c, Connecticut valley. The latter figure is based on sales of domestic as well as foreign metal. Fabricators, while paying as high as 24.00c for part of the copper, are currently basing prices of their products on 21.50-cent metal and are forced to juggle sales terms to cover the difference in some cases. Dual prices, which were established following the suspension of the import duty on copper, are making for confusion. Average prices paid by consumers are moving slightly higher, indicating that more 24-cent metal is being purchased.

Production increased 9 per cent in this country in March to 74,340 tons and was the largest monthly output since the third quarter of 1944. February production came to 68,327 tons, according to the Bureau of Mines.

More than 500 tons of copper, bronze and brass will be sold on a sealed bid basis May 26 by the War Assets Administration. This metal is in the form of rods, bars, strips, sheets and tubing and is listed in catalog CG-93-1110.

LEAD — High prices are bringing out more lead, but are curtailing some of its uses, Mr. Crane told stockholders. He declared it unfortunate that private American buyers must compete outside the United States with foreign government buying. Some of these foreign purchases, he said, have been indirectly financed by United States funds. He pointed out that consumption of lead in this country is running about 300,000 tons a year in excess of prewar average. St. Joseph Lead Co. received an average price, including premium payments, of 9.30 cents a pound for its lead production last year.

The current market is steady on the basis of 14.80c to 14.85c, East St. Louis, for the common grade. Demand for metal was well sustained last week and very few deferments on shipments have been asked. In such instances, other consumers are anxious to accept available tonnage.

Sale of 1605 short tons of lead scrap imported from Japan, was announced last week by the U. S. Commercial Co., RFC subsidiary. Average price received, on sealed bids, was 13.355 cents per pound. Highest successful bid was 13.62 cents and lowest, 13.13 cents. Successful bidders were American Smelting & Refining Co., San Francisco; Bunker Hill Smelter, Kellogg, Idaho; Northwest Lead Co., Seattle; and Schuylkill Products Co., Baton Rouge, La.

ZINC — Demand for zinc is more spotty than it was earlier in the year. Competition in foreign business is sharper with prime western available for export at 10.50c, gulf ports, or about ⅛-cent lower than previously. Weakness in the foreign market is taken as an indication by some trade interests that the domestic market has passed its zenith, despite uncertainty as to the future of the premium price plan. Prime western was quoted unchanged last week at 10.50c, East St. Louis.

TIN — Demand for tin mill products still exceeds supply and this situation is expected to continue throughout 1947. American Can Co., in announcing its decision to discontinue its allocation program on tin mill products as of July 1, said there is still a need for every ton of such products that can be produced. Expected demand for containers will require uninterrupted tin plate receipts for the rest of 1947, the company said. Primary tin prices held last week at 80.00c, New York, for grade A.

ALUMINUM — Reynolds Metals Co., Louisville, Ky., is now offering for sale with prompt delivery primary aluminum pig, ingot and alloy ingot, the company announced last week. The offering, the first by Reynolds, is made possible by the fact that all new production facilities leased or purchased by the company during 1946 are now at peak production. Prices in cents per pound for 30-pound ingot are as follows: 99 per cent, 15.00c; 99.75 per cent, 15.50c; 99.8 per cent, 16.00c; 99.85 per cent, 17.00c; No. 13 and No. 43 alloys, 15.70c; No. 108 alloy, 15.60c; No. 142 alloy, 16.60c; No. 214 alloy, 16.50c. Prices for 50-pound pig are: 99 per cent, 14.00c; 99.80 per cent, 14.50c; 99.85 per cent, 15.00c; No. 2312 alloy (12 per cent Si; bal. Al), 14.30c. All ingots are of the 4-notch type, 28 inches long, 4¾ inches high, 4¾ inches wide at the base, 3 inches wide at the top; all dimensions approximate. Where volume justifies it, the company will supply other alloys and ingot shapes.

SILVER — Handy & Harman's "official" price of silver held last week at 72.75c an ounce on moderate volume of business.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c-24.00c, del. Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 21.25c, refinery, 20,000 lb or more; 21.50c, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 20.50c; 88-10-2 (No. 215) 27.25c; 80-10-10 (No. 305) 24.50c; No. 1 yellow (No. 405) 16.25c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 15.00c-15.25c; No. 12 foundry alloy (No. 2 grade) 14.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 15.50c; grade 2 (92-95%) 14.50c; grade 3 (90-92%) 13.75c; grade 4 (85-90%) 13.25c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlot; 22.50c 100 lb to c.l. Extruded 12-in. sticks 34.00c-38.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c, 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $85-$88 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.50 lb for 550 lb (keg); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 72.75c per ounce.

Platinum: $59-$62 per ounce.

Palladium: $24 per troy ounce.

Iridium: $85-95 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 32.93c; yellow brass 28.88c; commercial bronze, 95% 32.97c, 90% 32.36c, red brass, 85% 31.24c, 80% 30.63c; best quality 29.89c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 37.71c; nickel silver, 18%, 41.54c; phosphor bronze, grade A, 5%, 50.75c.

Rods: Copper, hot rolled 29.28c, cold drawn 30.28c; yellow brass, free cutting, 23.64c, not free cutting 28.57c; commercial bronze, 95% 32.66c, 90% 32.05c; red brass, 85% 30.93c, 80% 30.32c; best quality 29.58c.

Seamless Tubing: Copper 32.97c; yellow brass 31.64c; commercial bronze 90% 34.77c; red brass 85% 33.90c, 80% 33.29c; best quality brass 32.30c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlots 28.12c, less carlots 28.62c; magnet, delivered, carlots 31.13c, 15,000 lb or more 31.38c, less carlots 31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per 100 lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 29.84c; oval, 29.34c; electro-deposited, 29.09c; cast, 28.84c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 94.00c; ball, 1000 lb and over, 94.75c, 500 to 1000 lb, 95.25c, 200 to 500 lb, 95.75c; less than 200 lb, 96.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., 60.00c; 100 lb kegs, 60.50c.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.00c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A. B.	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.00c, No. 2 copper 17.00, light copper 16.00, composition red brass 15.75, auto radiators 12.25, heavy yellow brass 11.25, brass pipe 11.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper, 19.50-19.75; No. 2 copper, 18.50-18.75, light copper, 17.25-17.50; refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 17.62½c.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 16.50-17.00; No. 2 15.50-16.00; light copper 14.25-14.75; No. 1 composition red brass 13.75-14.00, No. 1 composition turnings 13.25-13.50, mixed brass turnings 8.50-9.00, new brass clippings 12.50-13.00, No. 1 brass rod turnings 13.00-13.50, light brass 7.25-7.75, heavy yellow brass 8.50-9.00, new brass rod ends 13.50-13.75, auto radiators, unsweated 10.00-10.50, clean red car boxes 12.00-12.50, cocks and faucets 10.50-11.00, brass pipe 9.75-10.25.

Lead: Heavy lead 12.50, battery plates 7.50-7.75, linotype and stereotype 12.75-13.25, electrotype 10.75-11.25, mixed babbitt 13.50-14.00, solder joints 15.50-16.00.

Zinc: Old zinc 5.50-6.00, new die cast scrap 4.50-5.00, old die cast scrap 3.50-4.00.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S, 8.50-9.00, old sheets 7.00-7.25, crankcase 7.00-7.25, borings and turnings 2.00, pistons, free of struts, 5.50-6.00.

Nickel: Anodes 19.50-20.50, turnings 16.50-17.50, rod ends 19.00-20.00.

Monel: Clippings 14.00-15.00, turnings 9.00, old sheet 12.00-13.00, rods 12.50-13.00, castings 10.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$30.00
No. 2 Heavy Melt. Steel	30.00
No. 1 Busheling	30.00
Nos. 1, 2 & 3 Bundles	30.00
Machine Shop Turnings	26.00-27.00
Mixed Borings, Turnings	26.00-27.00
Short Shovel Turnings	28.00-29.00
Cast Iron Borings	27.00-28.00
Bar Crops and Plate	37.00-37.50
Low Phos. Cast Steel	37.00-37.50
Punchings & Plate Scrap	37.00-37.50
Elec. Furnace Bundles	37.00-37.50
Heavy Turnings	31.00-31.50
Alloy Free Turnings	29.50-30.00
Cut Structurals	39.00-40.00
No. 1 Chemical Borings	31.00-32.00

Cast Iron Grades

No. 1 Cupola	40.00-41.00
Charging Box Cast	34.00-35.00
Heavy Breakable Cast.	33.00-34.00
Stove Plate	37.50-38.00
Unstripped Motor Blocks	37.50-38.00
Malleable	45.50-46.00
Brake Shoes	35.00-36.00
Clean Auto Cast	41.50-42.50
No. 1 Wheels	42.00-42.50
Burnt Cast	35.00-36.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	34.50-35.00
R.R. Malleable	44.50-45.00
Axles	40.00-41.00
Rails, Rerolling	37.00-37.50
Rails, Random Lengths	35.00-36.00
Rails, 3 ft and under	38.00-39.00
Rails, 18 in. and under	38.50-39.50
Railroad Specialties	41.00-42.00
Uncut Tires	37.00-38.00
Angles, Splice Bars	37.00-38.00

CLEVELAND

No. 1 Heavy Melt. Steel	$30.50-31.00
No. 2 Heavy Melt. Steel	30.50-31.00
No. 1 Busheling	30.50-31.00
Nos. 1 & 2 Bundles	30.50-31.00
Machine Shop Turnings	25.50-26.00
Mixed Borings, Turnings	27.00-28.00
Short Shovel Turnings	27.00-28.00
Cast Iron Borings	27.00-28.00
Bar Crops and Plate	33.50-34.50
Cast Steel	33.50-34.50
Punchings & Plate Scrap	33.50-34.50
Elec. Furnace Bundles	31.50-32.00
Heavy Turnings	30.00-30.50
Alloy Free Turnings	29.50-30.00
Cut Structurals	37.50-38.00

Cast Iron Grades

No. 1 Cupola	43.00-45.00
Charging Box Cast	38.00
Stove Plate	38.00
Heavy Breakable Cast.	38.00
Unstripped Motor Blocks	40.00
Malleable	52.00-55.00
Brake Shoes	42.00
Clean Auto Cast	45.00
No. 1 Wheels	42.00
Burnt Cast	38.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-35.00
R.R. Malleable	52.00-55.00
Rails, Rerolling	40.00-41.00
Rails, Random Lengths	38.00-39.00
Rails, 3 ft and under	44.00
Railroad Specialties	42.00
Uncut Tires	41.00
Angles, Splice Bars	44.00

VALLEY

No. 1 Heavy Melt. Steel	$31.00-31.50
No. 2 Heavy Melt. Steel	31.00-31.50
No. 1 Bundles	31.00-31.50
Machine Shop Turnings	26.00-27.00
Short Shovel Turnings	28.00-29.50
Cast Iron Borings	28.50-29.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-35.00

MANSFIELD

No. 1 Heavy Melt. Steel	$31.00-31.50
Machine Shop Turnings	26.00
Short Shovel Turnings	28.00

CINCINNATI

No. 1 Heavy Melt. Steel	$27.00
No. 2 Heavy Melt. Steel	27.00
No. 1 Busheling	27.00
No. 1 Bundles	27.00
No. 2 Bundles	27.00
Machine Shop Turnings	20.00
Mixed Borings, Turnings	19.00
Short Shovel Turnings	22.00
Cast Iron Borings	21.00

Cast Iron Grades

No. 1 Cupola Cast	40.00
Charging Box Cast	31.00
Heavy Breakable Cast.	32.00
Stove Plate	29.00
Unstripped Motor Blocks	32.00
Brake Shoes	28.00
Clean Auto Cast	38.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00
R.R. Malleable	42.00
Rails, Rerolling	35.00
Rails, Random Lengths	35.00
Rails, 18 in. and under	42.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$24.50-25.00
No. 1 Busheling	24.50-25.00
Nos. 1 & 2 Bundles	24.50-25.00
No. 3 Bundles	24.50-25.00
Machine Shop Turnings	21.50-22.00
Mixed Borings, Turnings	21.50-22.00
Short Shovel Turnings	22.50-23.00
Cast Iron Borings	22.50-23.00
Punchings & Plate Scrap	30.00-30.50

Cast Iron Grades

No. 1 Cupola Cast	33.00-34.00
Heavy Breakable Cast.	25.00-27.00
Clean Auto Cast	33.00-34.00

BUFFALO

No. 1 Heavy Melt. Steel	$32.50-33.50
No. 2 Heavy Melt. Steel	29.00-31.00
No. 1 Busheling	29.00-31.00
Nos. 1 & 2 Bundles	29.00-31.00
Machine Shop Turnings	22.00-22.50
Mixed Borings, Turnings	22.00-22.50
Cast Iron Borings	22.00-22.50
Short Shovel Turnings	24.00-24.50
Punchings & Plate Scrap	34.00-35.00
Elec. Furnace Bundles	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	37.00-40.00
Charging Box Cast	29.00-30.00
Heavy Breakable Cast.	34.00-35.00
Stove Plate	33.00-35.00
Malleable	40.00-41.00
Clean Auto Cast	38.00-39.00
No. 1 Wheels	38.00-39.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$29.00-30.00
No. 2 Heavy Melt. Steel	27.50-28.00
No. 1 Busheling	27.50-28.00
No. 1 Bundles	29.00-30.00
No. 2 Bundles	25.50-26.00
No. 3 Bundles	23.50-24.00
Machine Shop Turnings	22.50-23.00
Mixed Borings, Turnings	20.50-21.00
Short Shovel Turnings	23.50-24.00
Bar Crops and Plate	31.00-32.00
Punchings & Plate Scrap	31.00-32.00
Cut Structurals	31.00-32.00
Elec. Furnace Bundles	30.00-31.00
Heavy Turnings	29.50-30.00
No. 1 Chemical Borings	29.00-30.00

Cast Iron Grades

No. 1 Cupola Cast	39.00-41.00
Charging Box Cast	38.00-39.00
Heavy Breakable Cast.	37.00
Unstripped Motor Blocks	36.00-36.50
Malleable	46.00-48.00
Clean Auto Cast	39.00-41.00
No. 1 Wheels	42.00-43.00

NEW YORK

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$24.00-25.00
No. 2 Heavy Melt. Steel	24.00-25.00
No. 1 Busheling	23.00-24.00
Nos. 1 & 2 Bundles	23.00
No. 3 Bundles	22.00
Machine Shop Turnings	17.50
Mixed Borings, Turnings	17.50
Short Shovel Turnings	18.50
Punchings & Plate Scrap	27.00-28.00
Elec. Furnace Bundles	25.00-26.00
Cut Structurals	27.00-28.00
No. 1 Chemical Borings	23.00-24.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
Charging Box Cast	34.00-35.00
Unstripped Motor Blocks	32.50-33.50
Malleable	48.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$23.00
No. 2 Heavy Melt. Steel	23.00
Nos. 1 & 2 Bundles	23.00
No. 1 Busheling	21.00
Machine Shop Turnings	17.00
Mixed Borings, Turnings	16.00
Short Shovel Turnings	18.00
Bar Crops and Plate	27.00
Punchings & Plate Scrap	27.00
Chemical Borings	20.00

Cast Iron Grades

No. 1 Cupola Cast	38.00
Charging Box Cast	36.00
Heavy Breakable Cast.	38.00
Stove Plate	35.00
Unstripped Motor Blocks	33.50
Clean Auto Cast	40.00

CHICAGO

No. 1 Heavy Melt. Steel	$28.50-29.00
No. 2 Heavy Melt. Steel	28.50-29.00
Nos. 1 & 2 Bundles	28.50-29.00
No. 3 Bundles	26.50-27.00
Machine Shop Turnings	23.00-24.00
Mixed Borings, Turnings	23.00-24.00
Short Shovel Turnings	25.00-26.00
Cast Iron Borings	24.00-25.00
Bar Crops and Plate	31.00-31.50
Cast Steel	31.00-31.50
Punchings	31.00-31.50
Elec. Furnace Bundles	29.50-30.00
Heavy Turnings	28.00-28.50
Cut Structurals	30.50-31.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-40.00
Malleable	35.00-40.00
Clean Auto Cast	35.00-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	29.50-30.00
Rails, Rerolling	33.50-34.50
Rails, Random Lengths	32.50-33.50
Rails, 3 ft. and under	36.50-37.50
Rails, 18 in. and under	37.50-38.50
Railroad Specialties	34.50-35.50
Angles, Splice Bars	34.50-35.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$29.00-30.00
No. 2 Heavy Melt. Steel	29.00-30.00
Machine Shop Turnings	21.00-22.00
Short Shovel Turnings	21.00-22.00

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	37.00-38.00
Charging Box Cast	34.00-35.00
Heavy Breakable Cast.	30.00-33.00
Stove Plate	30.00-33.00
Brake Shoes	31.00-33.00
Clean Auto Cast	37.00-38.00
No. 1 Wheels	34.00-36.00
Burnt Cast	30.00-32.00

Railroad Scrap

R.R. Malleable	40.00-45.00
Rails, Rerolling	30.00-33.00
Rails, Random Lengths	29.00-30.00
Rails, 3 ft and under	36.00-37.00
Uncut Tires	32.00-34.00
Angles, Splice Bars	34.00-35.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$27.00
No. 2 Heavy Melt. Steel	27.00
No. 1 Busheling	27.00
Nos. 1 & 2 Bundles	27.00
No. 3 Bundles	25.00
Long Turnings	22.00
Short Shovel Turnings	24.00
Cast Iron Borings	23.00
Bar Crops and Plate	32.00-33.00
Punchings & Plate Scrap	36.00-37.00
Cut Structurals	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	36.00-37.00
Stove Plate	34.00-35.00
No. 1 Wheels	32.00-32.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.00
R.R. Malleable	37.50-38.00
Axles, Steel	33.00
Rails, Rerolling	36.00-37.00
Rails, Random Length.	30.00-31.00
Rails, 3 ft and under	32.00-33.00
Angles and Splice Bars.	32.00-33.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$19.04
No. 2 Heavy Melt. Steel	*19.04
No. 1 Busheling	*19.04
Nos. 1 & 2 Bundles	*19.04
No. 3 Bundles	*17.04
Machine Shop Turnings	*12.54
Bar Crops and Plate	18.00
Cast Steel	18.00
Alloy Free Turnings	8.00
Cut Structurals	20.00-20.50
Tin Can Bundles	17.00

Railroad Scrap

Axles	26.50
Rails, Random Lengths	21.00
Uncut Tires	28.00

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	20.00
Nos. 1 & 2 Bundles	20.00
No. 3 Bundles	18.00
Machine Shop Turnings	11.50
Mixed Borings, Turnings	11.50
Punchings & Plate Scrap	21.50
Cut Structurals	21.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast.	21.50
Stove Plate	23.00
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Railroad Malleable	27.50
Rails, Random Lengths	20.00
Angles and Splice Bars.	21.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
Nos. 1 & 2 Bundles	19.50
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	27.50
Elec. Furnace Bundles	27.00

Cast Iron Grades

No. 1 Cupola Cast	30.00

Sheets, Strip. . .

Stringency in flat-rolled carbon products likely to continue through 1947

Sheet Prices, Page 142

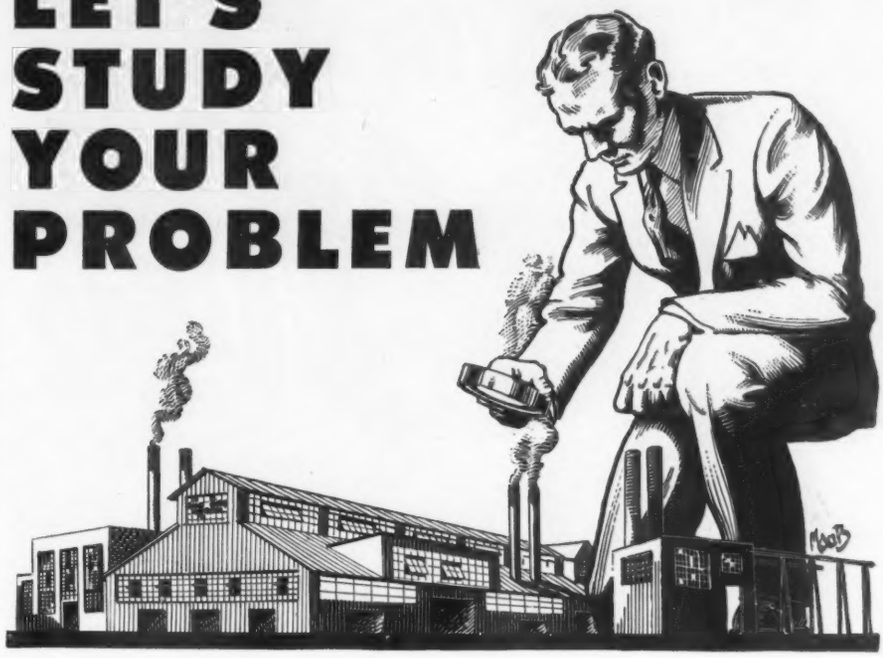
New York — Although on an average there should be a little more sheet tonnage available in the third quarter than at present, there undoubtedly will be a continued stringency, with consumers generally desirous of getting more tonnage than they will receive. In fact, one large independent has been unable to make any headway on his arrearages and in practical effect has allocated no new tonnage for the third quarter, except for some additional sheets for the car program and the setting aside of allotments for the housing program. Uninterrupted production through September would relieve the pressure somewhat. Shipments of sheets and strip in March were at an annual rate of about 18,200,000 tons and, if sustained at a rate even approaching the March figure, would mean probably the highest total for the year in history. However, unless a general business recession of rather serious proportions develops, there should still be an excess of demand. One sheet seller, who has been selling on a month-to-month basis, has blanked out the month of July due to labor slowdowns and is now accepting specifications for August.

Boston — Inability to increase supplies of sheets and strip in most finishes, stainless excepted, is affecting new buying of other steel products by more consumers. Orders are being placed on an inventory basis and are slower for some steel goods on which users are better supplied than they are on sheets and strip. Minor deferments and some cancellations have been reported, but there are substantial order backlogs to fill any openings. Narrow strip production schedules are sensitive to supply of hot-rolled for conversion and, while aggregate tonnage of the latter shipped to converters is probably in excess of any previous period, the range in sizes and grades is unbalanced. Cold-rolled strip is still allocated for third quarter with but slight additional volume in sight for distribution. New buying has eased slightly as some consumer goods pipe lines are becoming filled at retail levels. Pressure for delivery, however, is as strong as ever.

Philadelphia — Stringency in sheets continues. Some mills are promising their regular customers no more tonnage for this summer than they are now supplying, and one is going into the third quarter with such heavy arrearages that it is promising nothing in the way of new tonnage, after setting aside allocations for the housing and car programs. However, promises on an average are slightly heavier than for the current period. One midwestern producer is withdrawing as a seller of hot-rolled strip.

Cleveland — Sheet and strip sellers have been unable to reduce their order backlogs and in some instances have fallen behind second quarter shipping schedules. Therefore, they have refrained from opening third quarter books and will use a large portion of that period's output to bring orders up to a current basis. Consumers will receive actually

LET'S STUDY YOUR PROBLEM



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Engineers and Architects

DETROIT

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MATHEWS CONVEYER COMPANY
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Engineering Offices or Sales Agencies in Principal American and Canadian Cities

about the same tonnage as they are at present. Automotive and household appliance industries are among those exerting the greatest pressure for increased shipments.

Chicago — Consumers of sheet and strip in this area suffered a setback from the week-long shutdown of Inland Steel Co. by strike. Manufacturers depending upon this producer for material have been advised that shipments will be delayed two to three weeks but without reduction of quotas for second quarter. Since there is little prospect of making up lost ground, third quarter allocations will be re-examined in light of second quarter carryovers.

Birmingham — Sheet supplies show no indication of easing in this territory. As a matter of fact, no general mprovement is anticipated, and then only moderately, until completion of cold rolling facilities several months hence. Potential new demand for sheets is expected to account for additional capacity in rather short order.

Steel Bars. . .

Easing noted in demand for carbon bar tonnage with exception of small sizes

Bar Prices, Page 142

Philadelphia — A heavy volume of carbon bar tonnage is still moving, although demand is easing, except for small sizes, due to inability of consumers to get other materials needed in their assemblies. Cold-drawn carbon bars are in easier demand than hot-rolled, although supply of small sizes is still tight. Alloy bars are plentiful. Bar shipments for the railroad car program are being stepped up close to the 30,000 tons per month scheduled for the third quarter.

Boston—Volume in cold-finished carbon bars is well supported for screw machine parts, but in some directions new buying has slackened mildly. Pressure for delivery on small carbon bars is unabated but supply of alloys and larger sizes of carbon bars is generally ample. While spotty, overall supply of bars has improved and some industries have increased their inventories. Excepted from this category are carbon flats, including cold-drawn, while quarter rounds are short. Trend toward heavier consumption of carbon stock by forge shops is pronounced while in some cases volume of alloy bars has been reduced. More users are reluctant to accept excess shipments on even small orders, indicating an easing in supply, whereas two months ago any over-shipments were welcomed.

Pittsburgh—No let-up in requirements for merchant bars in smaller size ranges has yet developed or is indicated until late third quarter at the earliest. Augmented freight car construction program has accentuated the tight supply outlook, while increasing requirements are developing from automotive parts suppliers. Output of cold-finished bars has recorded little change in recent weeks, with operations still restricted by limited supply of hot-rolled bars and fact that inventories are unbalanced. Demand outlook for cold-finished bars is unchanged, although an occasional shipping deferment is reported. Many consumers are watching inventories more closely. Demand-supply situation in hot-rolled alloy bars

continues in good balance with most mills able to promise delivery within 4 to 6 weeks.

New York — Hot carbon bar delivery promises continue to ease slightly, except on small sizes. One large independent asserts that his third quarter selling quotas are actually no larger than those for this quarter, considering all sizes as a whole; however, most others are planning to furnish a little more tonnage in the next three-month period. Cold-drawn bars in the small sizes also are difficult to obtain, but in general cold-drawn bars are freer than hot carbon, and sellers are willing to look further ahead on cold drawn. Some have tonnage on the books for fourth quarter and some have accepted orders for shipment after the turn of the year, where attractive specifications are involved.

Hot alloy bars remain relatively easy. One large interest is offering four to six weeks on ⅞ inches and larger, and 8 to 12 weeks on smaller bars. Cold-finished alloy bars are being offered by this producer in 10 to 12 weeks.

Cleveland—Merchant bar sellers have large tonnages of small sized bars on their books which should have been shipped weeks ago. Inability to make inroads on order backlogs has resulted in a decision by some producers to refrain from booking third quarter business and to apply that period's output against old orders. Some business is being booked in larger sized bars, however, for July and August delivery.

Cincinnati—District sheet mills have nearly completed fixing of allotments on third quarter schedules. These show slight, if any, increase in tonnage over the second quarter quotas despite pressure in some quarters for more steel. Tonnage on recent cancellations and requests for deferred shipments has been minor.

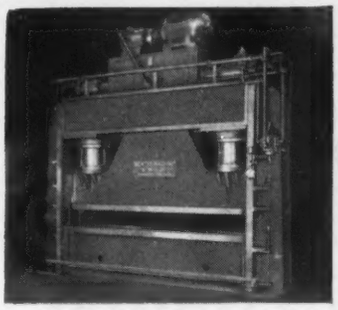
Chicago — While large sizes of carbon bars are not in as strong demand as recently, pressure for smaller sizes is unrelenting. Allocations of mills to customers are being fully specified against and cancellations are virtually nil. In many instances, consumers are seeking larger quotas, despite the fact that inventory balance is being watched carefully and buying is of a more cautious nature. Purchases of farm implements and machinery are good and manufacturers are pushing production to the highest possible levels. The supply situation as to bars has been aggravated by the seven-day production loss which Inland Steel Co. suffered through its strike. The company will not cut back second quarter quotas to customers, but deliveries will be delayed two to three weeks.

Steel Plate. . .

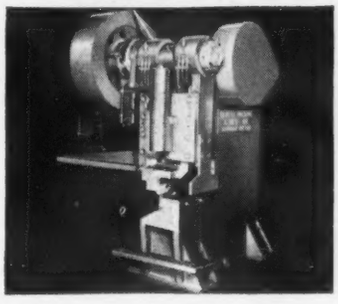
Plate Prices, Page 143

New York—While one plate producer has not yet opened his books for shipment beyond July, all but one or two mills, which are out of the market completely for the remainder of the year, are accepting some tonnage for shipment beyond that month. However, in most instances they have little or nothing to offer in the third quarter and are accepting tonnage sparingly for the fourth quarter. Certain mills, selling strictly on a quarterly basis, are taking nothing beyond the third quarter.

Meanwhile, demand is heavy for the light and medium thicknesses, with little



BEATTY Hydraulic Vertical Bulldozer for heavy forming and pressing.



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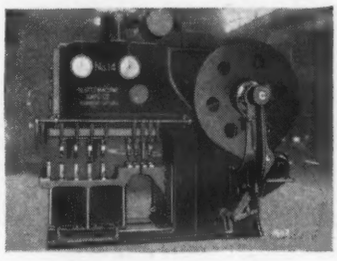
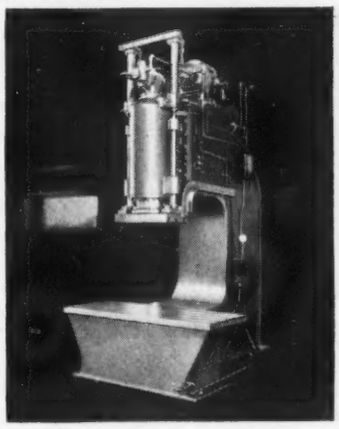


BEATTY No. 14 Toggle Beam Punch for structural steel fabrication.



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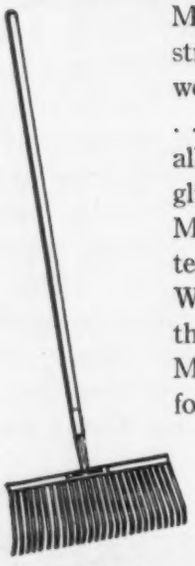
*Moksnes Manufacturing Co., Whitewater, Wisconsin



Flat tooth rake with flexible teeth made of Keystone wire

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appreciable easing in the situation expected before the latter part of the summer, and then only provided there is no serious disruption of operations, such as would result from a nation-wide coal strike on June 30. Most tank fabricators are unable to get operations up much above 70 per cent of normal capacity due to inability to obtain adequate supplies of plates; some leading line pipe makers are unable to get their production up even that high.

However, notwithstanding the increasing inroads of car builders on plate supply, most fabricators are being promised a little more tonnage in the third quarter than at present, as producers are getting caught up somewhat on their arrearages.

Boston — Heavy demand for large diameter steel pipe for replenishing warehouse inventories and for meeting railroad car building requirements will operate against early easing in plates. Given three months of high production, some improvement in supply at the warehouse level may develop in late third quarter. Miscellaneous industrial buying is well sustained and most tank builders clamor for more plates and heads, notably in light gages. Demand for small tanks has surpassed the most optimistic estimates. Buying of floor plates has been larger than expected following the sharp decline in shipbuilding. Large tank erection for water storage is lagging behind normal years due to high costs.

Philadelphia — Plate mills are sold throughout the third quarter, except in the case of tonnage that can be given some forming and prefabricating operations before leaving the plants, and some are practically booked up for the remainder of the year. Actually, one or two mills, while having taken nothing over the past few months for delivery next year, still have some old orders scheduled for early 1948 shipment. Arrearages vary with the different mills, but one at least is within two weeks of being caught up on back commitments. This has been due to the selective policy of the company in entering new business.

Birmingham — Plate order backlogs are being reduced slowly. Demand holds to a relatively high level. Tank manufacturers continue in the market for a large tonnage, while fabricators are using a reasonably big tonnage. Some projects calling for relatively large plate tonnage have been postponed indefinitely.

Seattle — Plate fabricators are handicapped by shortages of materials and are confining their bookings to small jobs, sufficient to maintain operations at a high level. Tank and boiler work is fairly active.

Wire. . .

Wire Prices, Page 143

Pittsburgh — Demand for wire rope has eased substantially in recent months; one of the few exceptions in an otherwise tight wire rope product supply situation. Wire rods are in particularly short supply, a condition which has forced many nonintegrated interests to operate well below capacity. Production of most wire products has recorded little change recently, holding at well above prewar levels in most instances. Output of nails is above the 70,000-ton monthly goal established by federal housing officials, and there is some indication production of this product may be curtailed slightly by some producers

next quarter. Among the merchant wire products, barbed wire and fence posts are in particularly short supply; while in manufacturers' wire group, demand remains extremely heavy for valve spring wire, electrical wire and cables. Export demand for all wire products remains heavy, especially for barbed wire.

Boston — Few consumers of wire rods are getting wanted requirements, although the suppy has improved in some directions. Thus, finishing mill schedules are geared closely to amount of rods available and are subject to frequent revisions. Lack of copper also is restricting output of cable mills. New buying of steel wire has dropped 20 per cent with some mills, and cancellations and deferments are cropping out in spots. Openings are readily filled by orders awaiting scheduling. Allocations for the third quarter are maintained on many products, including most high-carbon specialties. Screw manufacturers also are getting some cancellations, but most of them are still forced to allocate various sizes of screws. Reasons given for cancellations usually are unbalanced inventories or earlier duplicate buying on which first and second deliveries have been made.

One eastern rod producer has reequipped a mill for an extra, or third, strand, but some operational difficulties must be overcome. Nonintegrated mills are converting for consumers considerable tonnage of rods and wire on which prices for finished wire are high, 11.00c to 13.00c a pound, depending on grade and amount of processing required.

Chicago — High costs of building construction are easing the demand for some sizes of nails. Brads and tacks are affected similarly through reduced operations of furniture manufacturers because of customer resistance to present levels. Jobbers and dealers of merchant wire products observe the trend developing, but the slackening activity has not yet moved up to wire mill level. Construction and repair of fences has been impeded by excessive rains in the midwestern area. In manufacturers' lines, no slackening is reported. High carbon spring wire requirements are beyond mills' ability to produce. Cancellations are negligible although consumers are more selective in the material they will accept. Wire rope sales are improving, despite the availability of considerable war surplus material.

Birmingham — Wire products remain exceeding scarce. Jobbers are taking care of previous commitments in relatively small doses but believe a general overall improvement in nails and fencing will be in evidence by the end of the second quarter, or that at least some easing will have developed by then.

Coke By-Products . . .

Coke By-Product Prices, Page 144

Pittsburgh — Little improvement in foundry coke supply is indicated over the next few months, although the shortage should be corrected late this year following installation of additional by-product units by Diamond Alkali Co. and Semet-Solvay Co. Most producers expect to continue present policy of allocating tonnages through most of this year. Foundry coke inventories are well below normal, but in most instances pig iron presents a more acute raw material supply problem.

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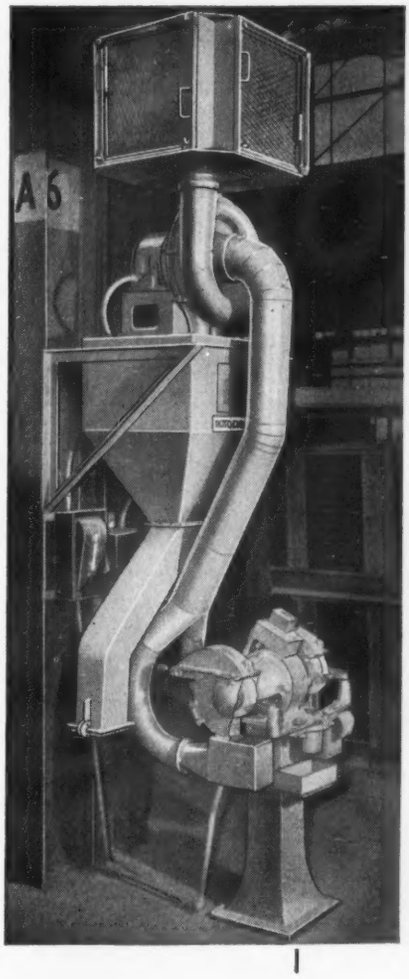

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Tin Plate Allocations for Export Increased Slightly

Office of International Trade, Department of Commerce, has announced country allocations of tin plate for the third quarter, totaling 120,000 short tons, a slight increase over those granted in the second quarter. Of this total, Latin American countries are to receive 41,943 tons and the rest of the world, 78,000 tons, leaving a small reserve.

Tin Plate. . .

Tin Plate Prices, Page 143

Pittsburgh — Unseasonable planting weather in the East and other factors have resulted in a downward revision in packers' estimated tin plate container requirements for this year. This situation has permitted American Can Co. to schedule discontinuance of its allocation program on tin mill products as of July 1. Earlier this year the estimated requirements for tin mill products were placed at 4.3 million net tons, with export tonnage around 400,000 tons. Tin plate producers state requirements from general line can manufacturers continue to far exceed supply, however, while there are some indications fourth-quarter export directives will be larger than the third-quarter commitments of 120,000 tons. The third-quarter export directives were trimmed down from original requests that totaled 240,000 tons.

Tin plate coating restrictions are expected to remain in force at least through first half of next year. Some tin plate producers believe pig tin supply will become tighter toward the close of this year and through first quarter of 1948. Pig tin output since termination of the war has been below predictions, forcing tin plate producers to rely heavily on reserves.

Tubular Goods. . .

Tubular Goods Prices, Page 143

New York — Merchant pipe supply shows little improvement. District distributors are unable to accumulate any stocks, with most tonnage even being sold before it is received. This is true despite the fact that much construction work is being held up because of high costs of materials and labor and uncertainty as to how much higher, if any, these costs may go.

However, there is still much coming out in the way of building repairs and alterations and in certain industrial lines, particularly utilities—all of which is accounting for considerable pressure for merchant pipe, both through the jobbers and through direct demands on the mills.

Considerable butt weld and other merchant pipe is going into various manufactured products with the overall result that most producers are sold up over the remainder of the year and could book tonnage for much further beyond were they disposed to do so. Certain mills, in fact, have done so, although they are the exception. Line pipe producers are booked two or three years ahead and longer in certain cases. On the other hand, certain tubular products, including some sizes of cold-drawn mechanical tubing, can be had for delivery within a month. On most sizes, however, books are filled for the remainder of the year.

Sellers of hot mechanical tubing are

generally sold out for 1947 on all sizes excepting 4 inch and larger tubing, for which promises can be made for early fall.

Most leading producers are sold out for this year on cold-drawn carbon boiler, condenser and super-heater tubes and on hot-finished boiler tubes. Still tubes, in practically all sizes and in both hot and cold-drawn carbon and hot and cold-drawn alloy grades, are difficult to obtain this year. In certain types of alloy tubing, however, the situation is highly competitive, but in general district representatives must first obtain approval from their mills before promising definite shipment.

Boston — Capacity for production of standard steel pipe has been narrowed to around 40 per cent of total tubular products due to heavy demand for other tubular goods, notably pipe for gas and oil lines. Oil drilling is limited now to the supply of steel and will be for some time. Not more than 2 million tons of standard steel pipe is likely to be available this year. From four to five months would be required to fill distributor requirements without covering a single foot of direct consumer needs. Outlook for supply of pipe for gas and oil lines is that demand will exceed capacity by 1 million tons annually over the next two or three years.

Seattle — Inquiry for cast iron pipe is slow, due to delayed deliveries which are now about 25 months ahead. Many sizable projects in this area have been deferred for this reason, making the potential demand large.

Structural Shapes. . .

Structural Shape Prices, Page 143

Chicago — Current exceedingly high building costs are restricting new construction, but volume of demand for fabricated structural steel exceeds the ability of fabricators to supply in view of their limited mill quotas on plain shapes. Numerous projects are being deferred, but fabricators express opinion that even more should be, particularly public work. They maintain that the latter should be held for times of low business activity. A good volume of structural steel inquiry is for state bridges. Recently there has been a tendency for fabricators to be asked to quote firm prices. Where firm prices have been given, the level appears to be a little higher than when escalator clauses are used.

Boston—Inquiry for fabricated structural steel is definitely slower, resulting in a shrinkage in small shops' order backlogs. There is a shortage of plain material, however, in small and lighter sizes of standard shapes for which demand is heaviest. Inquiry for broad beam heavy sections has eased with the slowing in inquiry for heavy construction. There is some further abandonment of escalator clauses by structural shops, although under normal economic conditions this industry operates on four to five months' contingency risk. Firm bids operate under public works contracts but some concrete estimates of higher costs are apparent in unit quotations.

New York — While several fair-sized jobs are under negotiation, little or nothing in the way of outstanding structural work has been placed here recently. Builders generally are awaiting stabilization of labor and materials costs before going ahead with anything other than essential construction. Recently there has been a hold-up in the veterans' housing program which accounted for some substantial tonnages here and upstate New York only a few weeks ago. One large veteran's hospital near Newark, N. J., was recently on the point of being brought out for figures, only to be held up. New York state bridge work has been negligible for the past few weeks, with little pending. Only the most essential work is being contemplated.

Philadelphia — Demand for structurals continues limited with few new inquiries and few awards. While most fabricators have substantial order backlogs, they are showing a livelier interest in new work and the situation at the shape mills is easing. Most shape producers are still behind on commitments but are likely to be fairly well caught up by mid-summer.

Birmingham — Structural demand holds to a relatively high level but not as insistent as a few months ago. Several instances have come to light recently where appropriations and preliminary estimates for new construction have been insufficient, especially in public works, with the result that plans are being held in abeyance. Shape backlogs have been materially reduced over the past few weeks.

Seattle — In face of low inventories and limited arrivals of new material, fabricating plants are confining their operations to small jobs involving steel in less than 100-ton lots.

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Reinforcing Bars. . .

Reinforcing Bar Prices, Page 142

Pittsburgh—Concrete bar output has held relatively steady in recent months at well above the 1939 monthly average rate. However, demand is close to double that experienced in 1939, despite fact present high construction costs have forced a considerable number of jobs to be temporarily postponed. Reflecting this latter situation, no bids were received recently on a 1200-ton Dayton, O., bridge job, for construction costs were far above money allotted. Under present mill production quotas and distribution allotments, sellers are booked through most of this year. One aspect of present distribution policy is that producers are not selling as many bars to outside fabricators. As in merchant carbon bars, some easing in demand is noted for larger rounds.

New York—Little sizable work is being figured by reinforcing bar sellers. While several new housing projects are in prospect, no plans have yet been issued nor any action taken on two large housing projects since bids were closed several weeks ago. Bids will go in late this month on 28 miles of paved New York state highways, mostly located in Franklin county, although the reinforcing steel will not be required until next year.

Boston — Close to 600 tons of reinforcing bars, including mesh, are required by Connecticut for road work and bridges, but inquiry in other directions is slackening. Nevertheless, while available tonnage of reinforcing bars is slightly improved, demand is still in excess of supply and contractors have trouble in placing all tonnage required.

Seattle — Although order backlogs for reinforcing bars have been reduced, the total still assures peak operations for several months. Recent bookings generally have been for small tonnages, but the total has been heavy, one plant having taken about 1000 tons last week in less than 100-ton lots for various construction jobs. Plants are in a position to take care of regular customers and to accept work that fits into schedules. Deliveries are on about a 60-day basis.

Pig Iron. . .

Pig Iron Prices, Page 144

Boston — Bulk of foundry iron in this territory is being supplied by the Everett furnace with shipments from Buffalo and other outside points slim. Next month brings to an end low priced iron for New England users who have been paying since last November the lowest prices in the country for foundry grades due to the $12 per ton government subsidy granted the Mystic furnace at Everett, Mass. Starting July 1, base price for Mystic iron will increase sharply to $45 a ton to consumers who are party to the mutual co-operative agreement.

New York—Coke rather than pig iron continues to handicap most district foundries, although the situation is not quite as acute as it was a few weeks ago, for the reason that consumers are developing a greater supply of beehive coke to supplement receipts of by-products coke, which are off substantially due to a program of major repairs at the Swedeland, Pa., ovens of the leading seaboard producer. Notwithstanding the scarcity of

R-S Furnace Facts

FOR THOSE CONCERNED WITH QUALITY HEATING OF METALS

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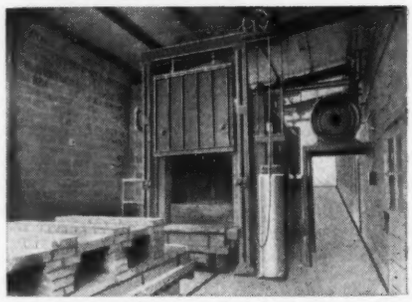
In heat treating high alloy castings at 2100° F, the Cooper Alloy Foundry Company, Hillside, N. J., saves fuel, floor-space and time through R-S furnace design here pictured.

R-S provides doors at both ends of the furnace, and two car hearths. Thus, while one car is in the furnace and the charge is being heated, the other car is unloaded and reloaded, so that no time is lost between heats.



As a result (1) the fuel normally required to hold an empty furnace at heat while the charge is made ready is saved; (2) a smaller furnace produces more tonnage per day; and (3) furnace life is increased because less violent heat-and-cool cycle goes on in the furnace chamber. "Playing both ends against the middle," say R-S designers, "is desirable in the foundry."

A rotary hearth in Detroit
Had holes in the wall like a quoit.
Said a fellow named Schmaltz,
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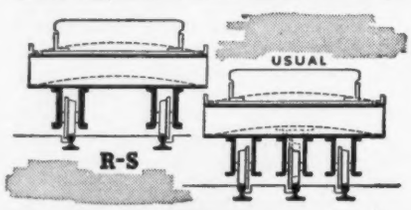

Third wheels shirk the job . . . Heat distorts a wide hearth (see dotted lines) so third wheels lift, and overload the others. The R-S solution is to design for ample "beef" so that *two* will do the job right.

JMLCO P-E1

FURNACE DIVISION
R-S Products Corp.
PHILADELPHIA 44, PA.

coke, some foundries could use more pig iron were it available.

Philadelphia — Consumers are still pressing for pig iron, but not quite as fervently as earlier this year. Some foundries are experiencing casting order cancellations and also are finding cast scrap supply a little easier, with prices lower.

Pittsburgh—Removal of directive tonnage commitments for the federal housing program has made possible more equitable distribution of pig iron. However, output here represents only 60 per cent of customers' stated requirements, with result distribution remains under strict allocation.

Buffalo — Sustained urgent demand for merchant iron is taking up whatever leeway might take place from an increase flow of order cancellations. Sellers do not seem concerned over the elimination from the books of some old outstanding orders. Demand continues to exceed output although, in some instances, foundries report heavier inventories. Melters claim the failure of limited coke supplies to improve in quality is becoming more of an operating problem.

Iron Ore. . .

Iron Ore Prices, Page 144

Washington—Production of iron ore increased in all districts during March, the total being 10 per cent larger than in February, according to the Bureau of Mines. Production totaled 2,846,168 tons in March compared with 2,590,928 tons in February. Shipments increased in most districts, although a sharp drop was recorded from western mines. Shipments increased 8 per cent over February and amounted to 1,425,200 gross tons; in February shipments were 1,322,123 tons. The increases were proportional to the lengths of the respective months.

Lake Superior iron ore traffic got away to a good start in April when shipments totaled 4,448,411 tons, an increase of 3,718,509 tons over the total for April, 1946, according to the Lake Superior Iron Ore Association, Cleveland. Loadings amounted to 4,422,103 tons at United States ports and 26,308 at Canadian ports.

Chicago—Merchant pig iron supply continues to fall short of melting requirements and with no prospects of improvement in the situation any time soon. Furnace production is fully allocated and foundries press for larger quotas. The overall shortage of iron suffered from the recent strike at Inland Steel Co. is a loss that simply cannot be made up under present consumption requirements. Foundries also are faced with shorter coke supplies in the next three months, Interlake Iron Corp. having shut down a battery of coke ovens for repairs, with other batteries to go down in succession.

Cincinnati — Pig Iron continues in short supply although furnaces entered commitments for this month at tonnage comparable to recent levels. Foundries could use more iron, to cut extensive backlogs, but have relaxed pressure somewhat in view of a bottleneck in coke.

Birmingham — Pig iron demand continues unabated. Need for additional iron throughout the territory is urgent. Foundries generally are in a somewhat better position, due largely to larger scrap supplies.

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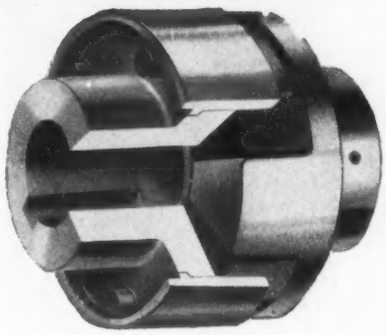

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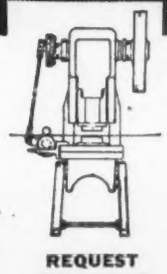

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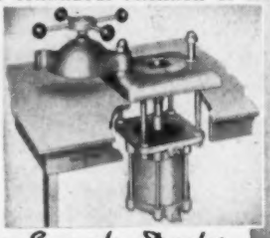

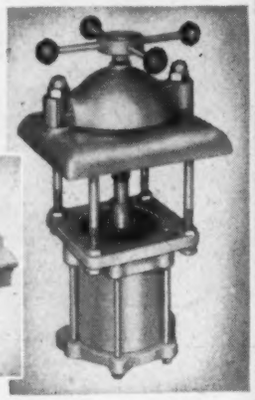

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Scrap. . .

Scrap Prices, Page 148

Pittsburgh — Very little heavy melting steel tonnage is being bought at the $30 price, with most consumers out of the market. A number of higher price orders are still outstanding, which may be a factor retarding new buying. Mills report incoming scrap receipts from customers are in good volume, which combined with limited tonnage from dealers and brokers, have made it possible to maintain inventories despite record steel output. Cast iron scrap supply is somewhat easier, but prices remain strong with sale of No. 1 cupola within range of $40 to $41 noted. Some foundries have purchased select grades of heavy melting steel at around $32. Railroad heavy melting sold at $35 and specialties at around $42.

Philadelphia — Scrap prices are leveling off here with a little further easing noted in some of the cast grades. Some trade leaders believe the bottom of the current price movement has about been reached. No. 1 cupola cast is off slightly to $39 to $41, delivered; heavy breakable cast to $37, unstripped motor blocks to $36 to $36.50, malleable to $46 to $48, and clean auto cast to $39 to $41.

New York—While there has been relatively little change in steel scrap prices, New York brokers have reduced prices on cast scrap rather sharply. They are now paying $35-$36, fob shipping point, for No. 1 cupola cast, $34-$35 for charging box cast and heavy breakable and $32.50-$33.50 for unstripped motor blocks. Malleable continues scarce but is a shade easier at $48.

Pittsburgh consumers of heavy melting steel continue out of the market here. However, there is some buying for eastern Pennsylvania at unchanged prices. Among the few revisions in steel scrap is the change in No. 1 busheling to a spread of $23-$24, Nos. 1 and 2 bundles, to $23, No. 3 bundles, $22, and electric furnace bundles to $25-$26.

Boston — Steel scrap prices are expected to decline to the vicinity of $21, fob shipping points, if the Pittsburgh price level stabilizes around $30, delivered. Lower prices at Buffalo are also a weakening factor. Steel scrap is more plentiful on the reaction and consumers are more critical of grade specifications. Light iron and steel for bundles declined to $10 from a peak of $19.

Buffalo — New receipts of scrap are now running well ahead of consumption. The market, however, marks time with the possibility cited that the list may hold its own around current prices for about a month and then decline an additional $2 to $3 during the summer. Seasonal pickup in the scrap movement has reached substantial proportions. Two leading mill consumers in the area have accumulated sizable stockpiles in the last four to six weeks. Reserve stocks are slated to grow even faster as soon as the navigation season gets into full swing and lake shipments start arriving. The break between No. 1 heavy melting and No. 2 material is now definitely established in some trades and ignored in others. One mill absolutely refuses to accept No. 2 bundles on the same basis as No. 1 scrap. The price range on the latter is $32.50-33.50, while No. 2 scrap is changing hands at $29-31. Two other top buyers continue to place contracts without differentiating between No. 1

and No. 2 offerings.

Detroit — A firmer tone prevails in the scrap market, prices holding unchanged last week. Movement of material is somewhat slower than that experienced during April. Suspension of body manufacture for Chrysler divisions this week, along with slowed operations in Fisher Body plants, resulting from exhaustion of steel floats, will cut the supply of production scrap available this month. Since this material is all channeled to steel mills, the net effect on the market will not be significant.

Chicago—A buyers' market continues to prevail here and no good test has been made of current prices. Possibly two to three weeks may pass before significant transactions occur. Mills are well stocked and are receiving substantial shipments against old orders which were placed at higher prices. Indicating that scrap is plentiful, consumers are critical of quality and are rejecting below-standard material. While some new buying may command slightly above listed quotations, lack of volume has a weakening effect on the price structure. Brokers' commissions were inadvertently omitted from published quotations in the Chicago scrap price table last week.

Cleveland—Although additional purchases of heavy melting steel were made last week by Youngstown mills, establishing that market firmly at $31 to $31.50, the local market held unchanged on the basis of $30.50 to $31.

Cincinnati—Scrap prices sagged here last week, heavy melting steel dropping $2, in a market which was marked by absence of tonnage purchasing. Heavy shipments before contracts expired recently built up inventories, even foundries attaining a more comfortable position.

Seattle — Steel scrap is arriving in greater volume, permitting mills to add to inventory. Cast iron scrap shipments also are larger. Mills are still paying $20 a gross ton, fob mill, for No. 1 heavy melting steel, although there may be downward revisions in prices soon.

Birmingham — Scrap prices continue unsteady and the trend is downward even after the declines reported previously. A much more satisfactory tonnage is evident on the whole.

Warehouse. . .

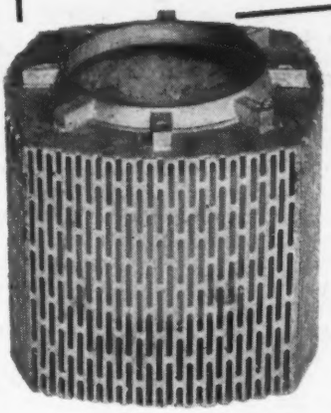
Warehouse Prices, Page 145

Pittsburgh—Despite exceptionally large finished steel output since first of the year, record peacetime demand for nearly all steel products has prevented steel distributors from augmenting inventories which are lowest on record. Pressure for prompt delivery remains acute, to the extent in some instances that mill receipts are shipped directly to customers. On basis of present mill delivery promises, some distributors are hopeful of being on a current ordering basis with the mills by end of this quarter.

Boston — Warehouse distributors look for some improvement in supplies of critical steel products in the third quarter, although mills have not given much definite encouragement. Distributors are holding up some tonnage, including alloys, on which they are well supplied, but are exerting pressure for larger allotments of flat-rolled items, small bars, plates, structurals and wire products. Merchant steel pipe also is short.

Chicago — Steel warehouses are un-

Perforated Strainers and—



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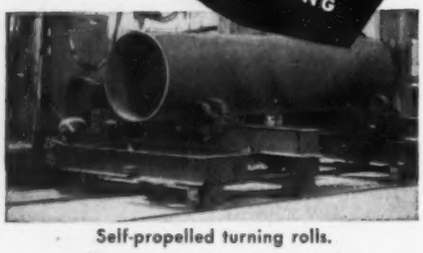

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able to accumulate stocks of steel except for large sizes of carbon bars, alloys and cold-drawn bars. Sales of flat rolled products, small carbon bars, light structurals and the like, run nip and tuck with mill receipts. The overall situation was aggravated, of course, by the seven-day strike at Inland Steel Co. which cost the production of between 100,000 and 110,000 ingot tons of steel. Consumer demand shows little sign of moderating, although there are definite indications that buying is of a more cautious nature. Despite this, demand for steel exceeds availability.

Cincinnati — District jobbers are moving scarce steel, such as flat-rolled, small bars and structurals, so rapidly that stocks constantly remain out of balance. Ordering shows no abatement.

Seattle — Jobbing houses report a large, sustained volume of inquiry for all items obtainable. Stocks are badly broken and well under normal levels. Minor revisions of extra items have been made in line with changes in mill prices. Shortage in sheets is particularly acute, and no relief is expected this year. Small angles, small bars and reinforcing bar supplies are also short.

Rails, Cars . . .

Track Material Prices, Page 143

New York — Recent car orders have consisted almost entirely of small lots and have not been numerous. Meanwhile, new inquiries also have been light. This situation points to a decline in car buying for the month of May. However, it is still too early for firm predictions.

Ferroalloys . . .

Ferroalloy Prices, Page 145

New York—Upward revisions in ferrotungsten and tungsten powder prices have been forced by increased costs for ores due to the lack of tungsten ore offerings and stepped-up world wide demand for this material. Electro Metallurgical Sales Corp. has increased ferrotungsten prices 17 cents a pound of contained tungsten, making the new eastern zone contract price $2.25 in lots of 10,000 pounds or more of contained tungsten. Tungsten metal powder prices are increased 10 cents a pound, making the new eastern zone price for the melting grade $2.90 in lots of 1000 pounds or more. The new prices were effective May 13 on a spot basis and are effective June 1 on a contract basis.

Canada . . .

Toronto, Ont. — Prices of Canadian pig iron have advanced $6.50 per gross ton, retroactive to Apr. 15, to the following ceiling levels: Base grade, 2.25 silicon and under, $37; malleable, $37.50; basic, $37, delivered Toronto. Montreal prices are: Base grade, $39.50; malleable, $40 and basic, $39.50. Producers accept forward delivery bookings on basis of "price at time of shipment." The new price is still below the United States price on iron delivered to Canadian consumers when duty, freight and exchange are added.

Pig iron production is holding at slightly better than 70 per cent of total rated capacity. Merchant pig iron sales total about 10,000 tons weekly, and this tonnage could easily be exceeded if iron were available. The serious shortage of scrap iron has been reflected in increased demand for pig iron, most foundries having been forced to make greater use of iron in melting operations.

While steel production is running close to 90 per cent of rated capacity, output is still below consumer requirements. Inquiries for all lines of steel are numerous, but order bookings are lighter due to the fact that some steelmakers' books are filled to the end of June and they are not accepting third quarter commitments.

Mills are booked solid on steel sheets. Demand for steel plate has shown steady improvement recently, chiefly due to the big railroad rolling stock orders placed and a step-up in shipbuilding operations as well as in other branches of industry.

Bolts, Nuts. . .

Bolt, Nut, Rivet Prices, Page 143

Cleveland—Although order backlogs for fasteners continue to hold up well and delivery dates extend over the rest of the year or longer, slight easing in some of the smaller sizes is noted, with some consumers, for the first time since the war, being able to stock some sizes. Pipe lines appear to be filling slowly, even in the sizes half-inch and under.

Operations Cut by Lack of Steel in Metalworking Shops

(*Continued from Page* 54)

sheet shipments this year may top those of 1946 by 38 per cent and those of 1941 by 86 per cent. Galvanized sheet shipments should top the 1946 movement by 10 per cent and hold about level with 1941. Electrical and enameling sheet movement this year should score a rise of 25 per cent over a year ago but drop 26 per cent under 1941. Hot-rolled strip tonnage this year may rise 27 per cent over a year ago but fall 14 per cent under 1941, while cold-rolled strip shipments are indicated at 22 per cent above 1946 and 18 per cent over 1941.

Considerable hope for relief in the sheet and strip situation is tied to expectations that additional rolling capacity will come into operation over coming months. However, strikes at equipment suppliers' plants have slowed down installation of some of the projected mills so that originally specified dates for completion in many instances are out. Another adverse factor in this connection is that rising cost of equipment and installation may tend to discourage the pushing of projected projects. Latest compilation of new mills (STEEL, Apr. 14, p. 61) showed there were 61 recently installed or scheduled for early completion. Thirty-one of the mills listed were in operation or were scheduled for completion before end of third quarter. Of the total new and projected installations, 19 are continuous cold strip mills, 6 hot strip mills

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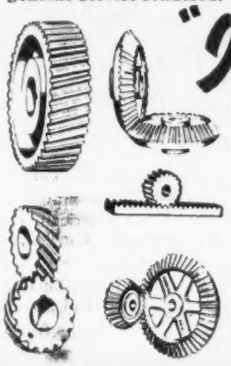

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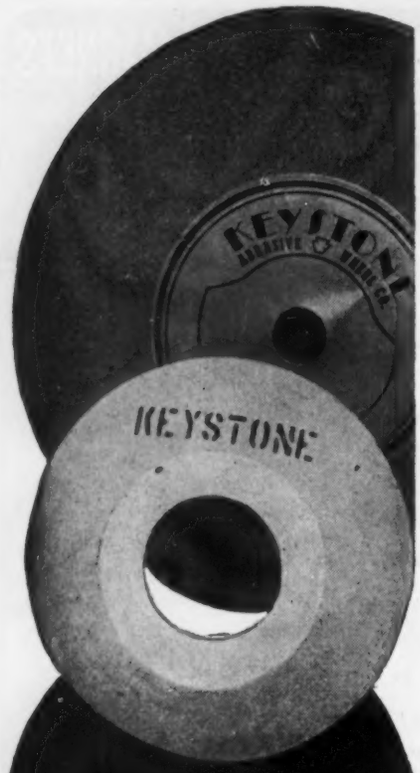

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and 11 skin or temper pass mills. Of these, 21 are in operation or were scheduled for completion before end of third quarter.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5000 tons, K St. viaduct development, Washington, to Bethlehem Steel Co., Bethlehem, Pa.

2300 tons, truck terminal, New York Port Authority, New York city, to American Bridge Co., Pittsburgh.

905 tons, highway bridge F 469(3), Tipton, Iowa, for state, to American Bridge Co., Pittsburgh.

700 tons, highway bridge, Crandall, Tex., for State Highway Department, to Virginia Bridge Co., Roanoke, Va.

500 tons, small miscellaneous construction projects, to Isaacson Iron Works, Seattle.

475 tons, continuous girder highway bridge, Stratford, Iowa, for state, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

300 tons, beam span, Sheridan, Ark., for State Highway Commission, to Virginia Bridge Co., Roanoke, Va.

240 tons, plant addition, Solvay Process Co., Syracuse, N. Y., to Belmont Iron Works, Eddystone, Pa.

147 tons, bridge 1-41, Ames, Iowa, for state, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

140 tons, sheet piling, Milwaukee, for city, to Inland Steel Co., Chicago; Edward E. Gillen Co., Milwaukee, contractor.

100 tons, addition, Esslinger Brewery Inc., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

Unstated, 325-ton gantry crane for Davis dam power plant, to Star Iron & Steel Co., Tacoma, Wash.; low $318,264.

STRUCTURAL STEEL PENDING

1200 tons, including bars and miscellaneous items, Columbia river state bridge, Northport, Wash.; bids to Olympia in late May.

800 tons, sewage disposal plant, Brooklyn, Tobias Heller, Manhattan, low on general contract.

490 tons, garage, Daily News, East 41st St., New York city, pending.

400 tons, vehicular ramp, ferry terminal, St. George, Staten Island, Rosenbloom Construction Co., New York, low on general contract.

350 tons, naval warehouse addition, Mechanicsburg, Pa.; bids closed May 16.

275 tons, including reinforcing bars, Washington state railroad crossing, Cowlitz county; bids to Olympia May 20.

240 tons, power house extension, Eastern Shore Public Service Corp., Vienna, Md.; bids asked.

215 tons, addition to Public School No. 105, Bronx, N. Y., Caristo Contracting Co., Brooklyn, low on general contract.

200 tons, bus terminal, Board of Transportation, Brooklyn, N. Y., bids opened May 16, following a postponement.

100 tons plus, state steel girder bridge, King county, Washington; Manson Construction & Engineering Co., Seattle, general contractor.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1000 tons, small miscellaneous construction projects, to Bethlehem Pacific Coast Steel Co., Seattle.

835 tons, dam on Frenchman creek at Enders, Nebr., Bureau of Reclamation, Denver, to Capitol Steel & Iron Co., Oklahoma City, Okla.; low $97,428.

300 tons, expansion, Plankington Packing Co., Milwaukee, to Joseph T. Ryerson & Son Inc., Chicago; bids March 10.

260 tons, power house and tunnel, Southern Illinois University, Carbondale, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

100 tons, Spiess building, Elgin, Ill., to Bethlehem Steel Co., Bethlehem, Pa.; Charles E. Giertz & Son, Elgin, Ill., contractor.

REINFORCING BARS PENDING

5000 tons, Union Pacific's 6700-foot, $8 million tunnel near Aspen, Wyo.; construction in June; W. C. Perkins, railroad engineer.

450 tons, building, Evinrude Motors Division, Outboard Marine Mfg. Co., Milwaukee; bids May 13.

425 tons, Duchesne tunnel, Provo, Utah, project; bids to Bureau of Reclamation, Denver, June 16.

140 tons, buildings, Drake University, Des Moines, Iowa; bids May 20.

Unstated, permanent buildings, Indiana University, Bloomington, Ind.; bids May 25.

Unstated, physical environment addition, Research and Education hospital, University of Illinois, Chicago; bids May 20.

PLATES . . .

PLATES PLACED

2100 tons, fifty-two 30,000-gallon propane tanks, J. E. Woodall Co., Milwaukee, to Bethlehem Steel Co., Bethlehem, Pa.

500 tons or more, Green river gravity water line, Tacoma, Wash., to American Pipe & Construction Co., Portland, Oreg., low at $591,676.

Unstated, oil storage tanks for Seattle terminal, General Petroleum Corp., to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

Unstated, 11,000-barrel capacity tanks for General Petroleum Corp.'s terminal expansion, Hoquiam, Wash.; bids soon.

PIPE . . .

CAST IRON PIPE PLACED

800 tons, for Portland, Oreg., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

300 tons, for Portland, Oreg., to Pacific States Cast Iron Pipe Co., Provo, Utah.

CAST IRON PIPE PENDING

Unstated, 32,000 feet of 2 to 8-inch cast iron pipe, also hydrants and fittings, for Mukilteo, Wash.; R. E. Wolff, Seattle, engineer; bids May 22.

RAILS, CARS . . .

RAILROAD CARS PLACED

Chicago, Rock Island & Pacific, two suburban trains, each comprising six cars, to Pullman-Standard Car Mfg. Co., Chicago.

Consolidated Chemical Industries, twenty-five 100-ton tank cars, to General American Transportation Corp., Chicago.

Detroit Chemical Works, two 50-ton tank cars, to General American Transportation Corp., Chicago.

General American Transportation Corp., 72 tank cars of miscellaneous capacities, to own shops.

Missouri-Kansas-Texas Railroad, 300 box cars and 200 hopper cars, to American Car & Foundry Co.

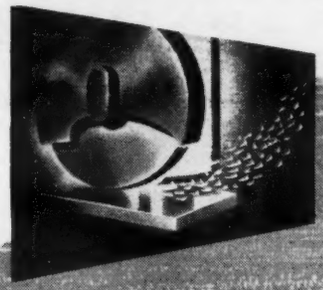
Monsanto Chemical Co., nine 50-ton tank cars, to General American Transportation Corp., Chicago.

Stauffer Chemical Co., two 70-ton and three 50-ton tank cars, to General American Transportation Corp., Chicago.

RAILROAD CARS PENDING

Detroit, Toledo & South Shore, 100 seventy-ton covered hopper cars, bids asked.

New York City Board of Transportation, 150 subway cars, American Car & Foundry Co., New York, low bidder.



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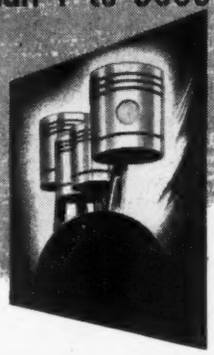

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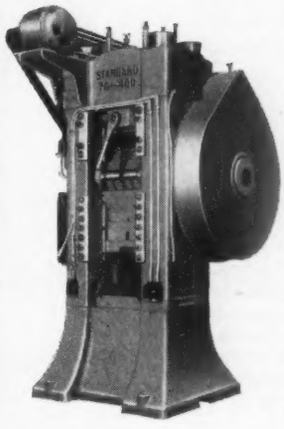

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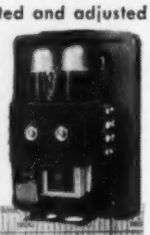
XACTLINE is laboratory tested and adjusted . . . does not require readjustment or coordination with other controllers.



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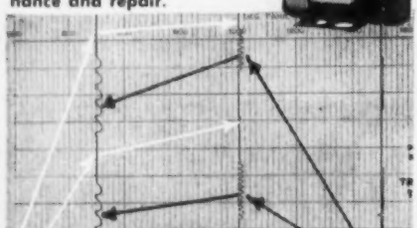

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CONSTRUCTION AND ENTERPRISE

ALABAMA

ALEXANDER CITY, ALA.—Russell Mfg. Co. will build a $120,000 factory addition.

BIRMINGHAM—American Cast Iron Pipe Co., 2930 N. 16th St., will build a $223,000 machine shop.

SHEFFIELD, ALA.—Electro Metallurgical Co. plans to build a furnace building costing $260,000.

CALIFORNIA

ANAHEIM, CALIF.—Essex Wire Corp. will build a factory addition at 1075 N. Patt St. The 1-story structure, 140 x 60 ft in area, will cost $45,000.

LOS ANGELES—Bethlehem Supply Co., 2800 S. Alameda St., will build a $500,000 factory and warehouse at 6418 E. Slauson Ave.

LOS ANGELES—General Petroleum Corp., 108 W. 2nd St., will build a 13-story office building at 612 S. Flower St. Cost will be approximately $7 million.

LOS ANGELES—Southwest Steel Rolling Mills plans to construct two mill buildings at its plant. To consist of a 50 x 65 ft building and a 25 x 35 ft unit, the project will cost $43,000.

COLORADO

GRANBY, COLO. — Bureau of Reclamation, Washington, D. C., has awarded a contract amounting to $591,458 to Vinnell Co. Inc., Alhambra, Calif., for construction of the Granby pump canal near here.

LA JUNTA, COLO.—Phillips Petroleum Co., Bartlesville, Okla., and Shamrock Oil & Gas Co., Shamrock, Tex., will build a $125,000 refined products pumping station.

INDIANA

EVANSVILLE, IND.—Faultless Caster Co., 1521 N. Garvin St., has awarded a $55,000 contract to Rust Construction Co., 1301 E. Michigan St., for a 1-story factory addition.

WHITING, IND.—Carbide & Carbon Chemical Co. plans to build a $180,000 manufacturing building.

MASSACHUSETTS

EVERETT, MASS.—Monsanto Chemical Co. plans to spend $7 million on a factory expansion here. Consulting engineer is J. R. Worcester & Co., 79 Milk St., Boston.

NORWOOD, MASS.—Winslow Bros. & Smith, 248 Summer St., Boston, will build a machine shop and plant additions here at a cost of $290,000. Architect is S. W. Orr, 78 Coolidge Ave., Needham.

MICHIGAN

WARREN, MICH.—Falls Spring & Wire Co., 8635 Conant Rr., Detroit, will build a steel spring factory addition costing $275,000. Plans are by C. W. Brandt, 1418 Woodwark Ave., Royal Oak.

MISSOURI

ST. LOUIS COUNTY, MO.—W. W. Faris Mfg. Co., 812 S. Theresa Ave., has awarded a contract to Walter F. Hellmich, 1037 Big Bend Blvd., St. Louis, for a building in which to manufacture railway maintenance sheet metal products.

ST. LOUIS—Continental Can Co. Inc., 7140 N. Broadway, has awarded a $500,000 contract to Fruin-Colnon Construction Co., 1706 Olive St., for a factory addition.

NEW YORK

BUFFALO—J. & A. Keller Machine Co. Inc. has been incorporated by Arthur Keller and associates with a capital of $100,000.

PALMYRA, N. Y.—Garlock Packing Co., Rubber Processing Dept., plans to build a 2-story addition, alter existing facilities and install new equipment. Total cost will be $110,000. Consulting engineer is James F. Mumper Co., Everett Bldg., 39 E. Market St., Akron.

OHIO

AKRON—Northern Ohio Heating & Ventilating Co. has been incorporated by Arthur M. Salzman, 580 Storer Rd., to manufacture and distribute heating and ventilating equipment.

CANTON, O.—Atlas Welded Products Inc., 3428 Navarre Rd. S. W., has been formed by E. J. Gussett and associates for the manufacture of tanks, stacks, trays, hoppers and other welded assemblies in steel and stainless steel.

CLEVELAND—Acme Brass Co., 13112 Caine Ave., has been formed with a capital of $50,000. Firm specializes in plumbing supplies.

CLEVELAND—Dresser Industries Inc., Terminal Tower, has signed a $6 million contract with the Soviet government to build a gas liquefaction plant 60 miles from Moscow, Russia.

CLEVELAND—Electro Finishing Corp., 4615 Superior Ave., has been changed from a partnership to a corporation by Edward Cableck and Robert F. Deucher. Firm plans eventually to expand its present building and install new equipment.

LORAIN, O.—Lorain Steel Stamping Co., 3553 Broadway, is starting a $50,000 expansion project which will add 15,000 sq ft of floor space to the present site of 45,000 sq ft.

LIMA, O.—Standard Oil Co. of Ohio, Midland Bldg., Cleveland, plans to build a catalytic cracking unit, gas plant, water-cooling tower, gasoline treating and blending facilities and a 200,000 barrel tankage addition which will cost $10 million.

MANSFIELD, O.—Roget Castings Inc. has been formed by John H. Rhoads, 144 Venum Ave., with a capital of $50,000 to manufacture and sell tools, dies and castings.

SOUTH EUCLID, O.—Pesco Products Co., Cleveland, is planning a $3 million plant at Glenridge and Green Rds. Proposed project will include office buildings, experimental laboratories and a plant for making airplane and automobile pumps.

PENNSYLVANIA

MAHANOY CITY, PA.—Delano Anthracite Co. proposes to build a breaker and cleaning plant costing $160,000.

PHILADELPHIA—Westinghouse Electric Corp., Pittsburgh, will build a $825,000 plant here.

YORK, PA.—McCann Mfg. Co. is rebuilding its plant at a cost of $350,000.

OKLAHOMA

DUNCAN, OKLA.—Skelly Oil Co., Tulsa, plans to build a gasoline plant here costing $2 million.

OREGON

PORTLAND, OREG.—Pioneer Division, Flintkote Co., has awarded a contract to Waale-Camplan Co. for construction of a roofing products manufacturing plant at Front and Doane Sts. To be 115 x 480 ft, building will cost $280,000 and will house equipment to cost $328,000.

VIRGINIA

RICHMOND, VA.—Virginia Tractor Co., 1628 W. Main St., plans to build a 2-story plant costing $150,000.

WISCONSIN

MILWAUKEE—National Enameling and Stamping Co., 270 W. 12th St. will build a $132,000 factory addition.

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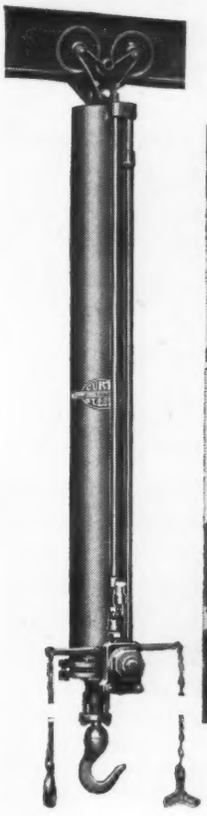

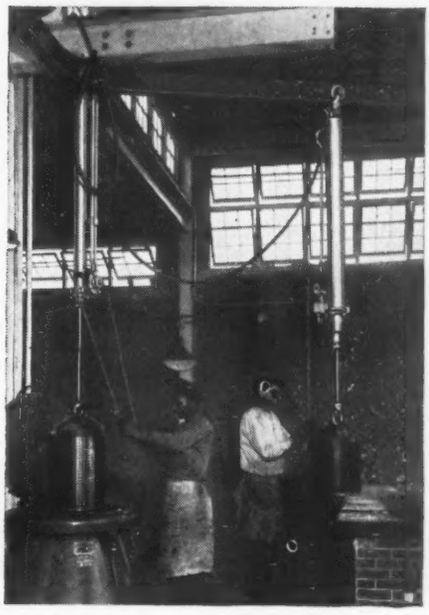

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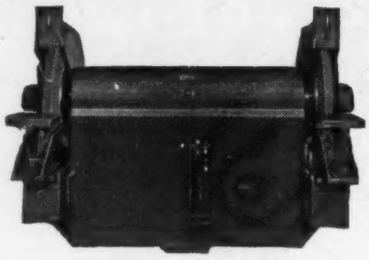

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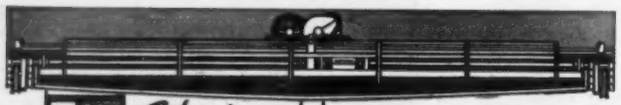

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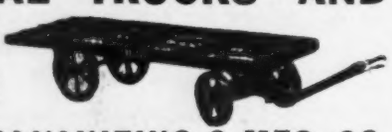

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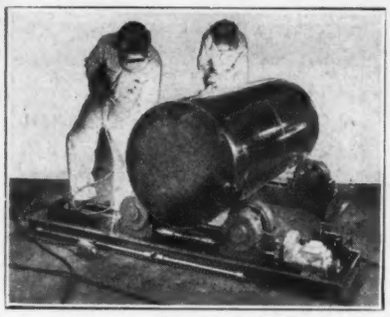

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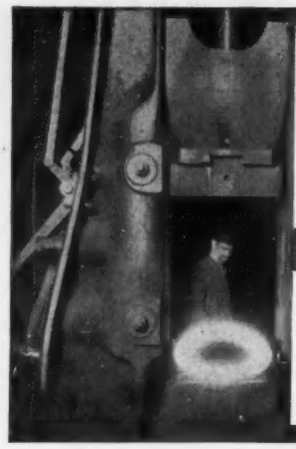

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ADVERTISING INDEX

A

Advance Foundry Co., The 154
Aetna-Standard Engineering Co., The ..... Inside Back Cover
Air Reduction 39
Ajax Electrothermic Corp. 40
Alliance Machine Co., The 134
Allis-Chalmers Mfg. Co. ..... Inside Front Cover
Aluminum Company of America 30
Aluminum Industries, Inc. 25
American Air Filter Co., Inc. 153
American Brake Shoe Co., National Bearing Division 19
American MonoRail Co., The 63
American Roller Bearing Co. 155
American Wheelabrator & Equipment Corp. 106
Associated Engineers, Inc. 8

B

Baldt Anchor, Chain & Forge Division of The Boston Metals Co. 168
Barnes, Wallace, Co., Division of The Associated Spring Corporation 38
Beatty Machine & Mfg. Co. 151
Belmont Iron Works 168
Bethlehem Steel Co. 1
Bixby, R. W., Inc. 171
Blaw-Knox Co., Pittsburgh Rolls Division 21
Bliss & Laughlin, Inc. 123
Browning, Victor R., & Co., Inc. 166
Brush Development Co., The 163

C

Carboloy Co., Inc. 95
Century Electric Co. 115
Chicago Perforating Co. 168
Cleveland-Cliffs Iron Co., The 104
Cleveland Wire Spring Co. 20
Climax Molybdenum Co. 68
Cowles Tool Co. 168
Curtis Pneumatic Machinery Division of Curtis Manufacturing Co. 165

D

De Laval Steam Turbine Co. 10
Detroit Broach Co. 24
Detroit Sheet Metal Works 44
Differential Steel Car Co. 167
Dulien Steel Products, Inc. 170

E

Eastern Stainless Steel Corp. 79
Economy Co., Inc. 169
Edison Storage Battery Division of Thomas A. Edison, Inc. 122
Enterprise Galvanizing Co. 166
Erdle Perforating Co., The 167

F

Firth Sterling Steel & Carbide Corp. 116
Follansbee Steel Corporation 22
Foote-Burt Co., The 31
Foster, L. B., Co. 170

G

Gas Machinery Co., The 132
General Electric Co. 45
Gerding Bros. 171
Gisholt Machine Co. 23
Goodrich, B. F., Co., The 3
Gordon, Claud S., Co. 164
Granite City Steel Co. 32
Greenlee Bros. & Co. 127

H

Hagan, George J., Co. 35
Handy & Harman 125
Harrington & King Perforating Co., The 154
Heil Process Equipment Co. 167
Hendrick Manufacturing Co. 159
Heppenstall Co. 103
Hubbard, M. D., Spring Co. 165

I

Industrial Gear Mfg. Co. 161
Ingersoll-Rand 2
Inland Steel Co. 51

J

Jackson Iron & Steel Co., The 168
Jira Thayer Jennings 171
Jones & Laughlin Steel Corp. 108, 109
Jones, W. A., Foundry & Machine Co. ... 129

K

Keystone Abrasive Wheel, Inc 162
Keystone Steel & Wire Co. 152
Kinnear Manufacturing Co., The 130
Koppers Co., Inc. 36, 37

L

Lamson & Sessions Co., The 100, 101
Landis Machine Co. 15
Landis Tool Co. 6, 7
Leschen, A., & Sons Rope Co. 161
Linde Air Products Co., The 26, 27
Littell, F. J., Machine Co. 157
Lovejoy Flexible Coupling Co. 157

M

Mackintosh-Hemphill Co. 121
Master Products Co., The 158
Mathews Conveyer Co. 150
Micromatic Hone Corporation 16
Midwest Steel Corp. 170
Molybdenum Corporation of America 41
Monarch Machine Tool Co. 46

N

National Bearing Division, American Brake Shoe Co. 19
National Carbon Co., Inc. 111
National Cylinder Gas Co. 42, 43
National-Standard Co., Worcester Wire Works Division 28
National Steel Corporation 17
New Jersey Zinc Co., The 71

O

Oakite Products, Inc. 156
Ohio Electric Mfg. Co., The 161
Ohio Galvanizing & Mfg. Co., The 166
Ohio Locomotive Crane Co., The 167
Ohio Steel Foundry Co., The 11

P

Pangborn Corporation 33
Pittsburgh Commercial Heat Treating Co. .. 166
Pittsburgh Gear & Machine Co. 167
Pittsburgh Rolls Division of Blaw-Knox Co. 21
Potter & Johnston Machine Co. 113
Precision Scientific Co. 158

R

Ransome Machinery Co. 160
Rapids-Standard Co., Inc., The 48
Reed Engineering Co. 167
Republic Steel Corporation 34
Revere Copper & Brass, Inc. 93
R-S Products Corp. 156
Russell, Burdsall & Ward Bolt & Nut Co. .. 97
Ryerson, Joseph T., & Son, Inc. 52

S

Salkover Metal Processing 171
Severance Tool Industries, Inc. 167
Sharon Steel Corporation 5
Shreve, Anderson & Walker 149
Simonds Gear & Mfg. Co., The 166
Standard Machinery Co. 163
Steel Tape Company of America 166
Stokerunit Corporation 98
Strom Steel Ball Co. 159
Sutton Engineering Co. 13

T

Taylor-Wharton Iron & Steel Co. 163
Taylor-Winfield Corporation, The 12
Thomas Steel Co., The 124
Timken Roller Bearing Co., The, Steel & Tube Division ..... Back Cover
Tinnerman Products, Inc. 77
Tri-Boro Steel Supply Co., Inc. 128
Trumbull Electric Manufacturing Co., The .. 14
Tube Reducing Corporation 118, 119
Tubular Service Corporation 168

U

Udylite Corporation, The 120
Union Carbide & Carbon Corporation 26, 27, 111

V

Vanadium Corporation of America 9
Vocational Intermediates 171
Vonnegut Moulder Corporation 166

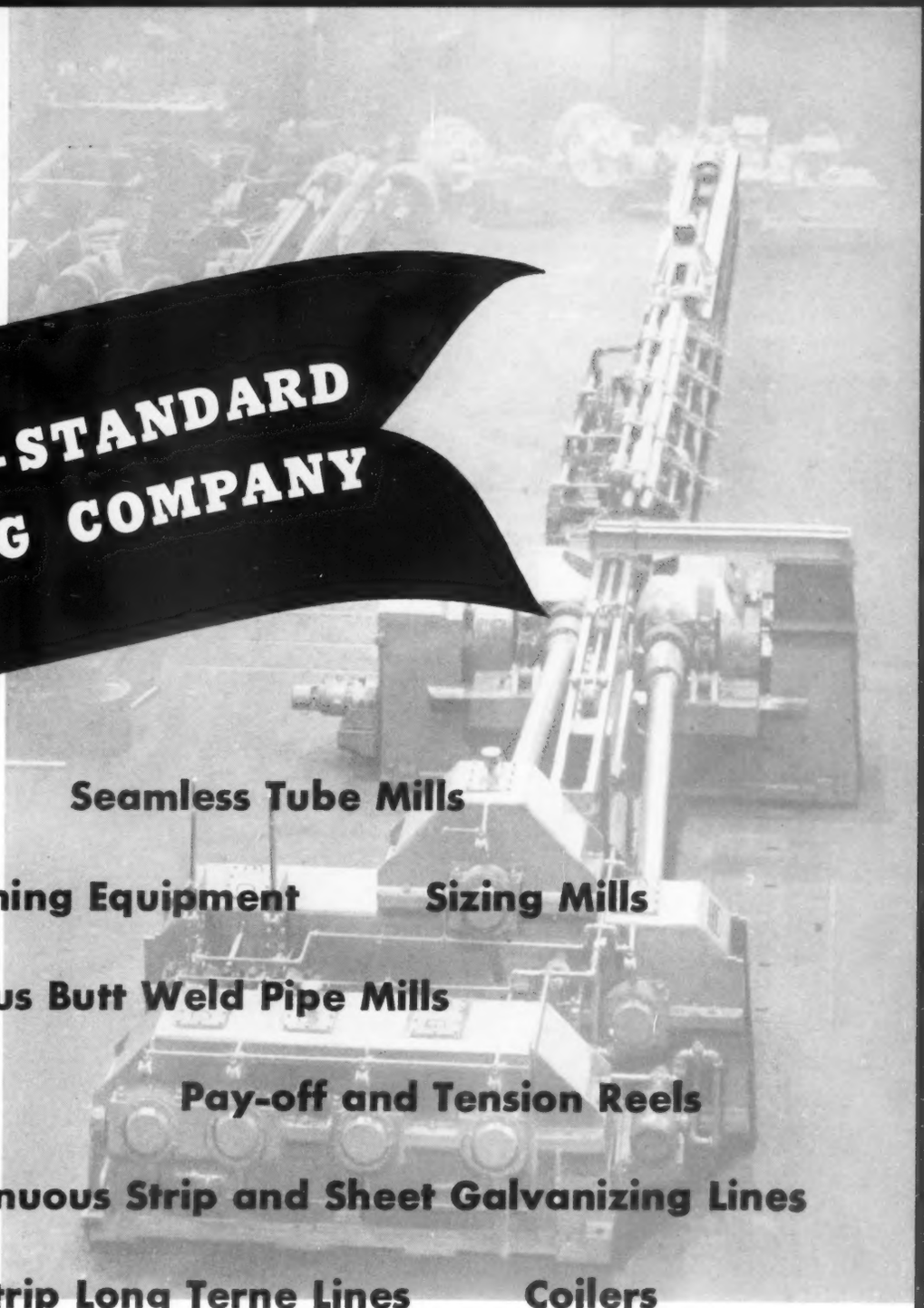
W

Wapakoneta Machine Co., The 133
War Assets Administration 105
Wean Engineering Co., Inc., The ..... Front Cover
Wean Equipment Corporation ..... Front Cover
Weirton Steel Co. 17
Wells Manufacturing Corporation 29
Wheeling Steel Corporation 167
Whitcomb Locomotive Co., The 18
Worcester Pressed Steel Co. 131
Worcester Wire Works Division, National-Standard Co. 28

Z

Zagar Tool, Inc. 165

Table of Contents, Page 47
Classified Advertising, Pages 169, 170, 171



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